A Preliminary Study of Kharoṣṭhī Manuscript Paleography

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Abbreviations

add.	additional fragment (see Allon and Salomon 2000)
BEFEO	Bulletin de l'École Française d'Extrême-Orient; Hanoi/Paris
BL	British Library
BSOAS	Bulletin of the School of Oriental and African Studies; London
JAOS	Journal of the American Oriental Society; Ann Arbor
JRAS	Journal of the Royal Asiatic Society; London
KDhp	Khotan Dharmapada (= "Gāndhārī Dharmapada," Brough 1962)
Khvs-G	Gāndhārī Version of the Khaggavisāṇa-sutta (= Salomon 2000)
MIA	Middle Indo-Aryan
OIA	Old Indo-Aryan
P	Pali
Pkt.	Prakrit
Skt.	Sanskrit
udd.	uddāna (see Salomon 2000: chapter 3)

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For all my parents

Note on the System of Quoting Letters

In this study I have reproduced many Kharoṣṭhī letters exactly as they are found occurring in the manuscripts, coins, and inscriptions. The following scheme outlines the system of referring to the archetypes of the forms found here.

For prose manuscripts in the BL collection: (BL [scribe number] frame [frame number][r-recto/v-verso] [part letter][line number]-[syllable number]). The part letter may be omitted in single piece manuscripts or those with clear continuous lines of text.

For manuscripts in verse format the references are modified as follows: KDhp: (KDhp [verse number][pāda letter][syllable number] [[line number]]); and Khvs-G: (BL 9 frame 15r [line number][pāda letter][syllable number]).

Manuscripts in the Schøyen collection are referred to as follows: (Schøyen [fragment number][r/v] [part letter][line number]-[syllable number]). The conventional designations a and b are substituted for fragments where recto and verso sides have not been established.

For the Niya documents: (Boyer, Rapson, and Senart 1920–9: plate [plate number] [document number] [line number]-[syllable number]). Forms taken directly from Rapson's chart, (Boyer, Rapson and Senart 1920-9: plate 14): (Rapson [syllable number]).

For the Aśokan inscriptions syllables are taken directly from Bühler 1904: table 1, (Bühler [row number]-[column number]), or from the plates published in Hultzsch 1925: ([Shāhbāzgaṛhī/ Mānsehrā] RE [rock edict number] [line number]-[syllable number]).

Syllables quoted from Konow 1929: (Konow plate [plate number] [line number]-[syllable number]).

Epigraphia Indica: (EI [volume number] [plate number] [line number]-[syllable number]).

For coin legends: ([Author] plate [plate number] no. [coin number]). Syllable numbers are not provided.

Punctuation marks are included in syllable counts. In the case of unedited manuscripts the syllable count may be approximate, particularly when the surface is damaged or otherwise illegible.

Syllables marked with an asterisk are damaged or incomplete in the original.

Part One

1.0 Introduction

In his introduction to the Khotan Dharmapada, Brough remarked that "in the sense in which palaeography is understood in relation to European documents, the paleography of Kharoṣṭhī is as yet unborn" (1962: 55). With the recent discoveries of significant numbers of manuscripts, a study of Kharoṣṭhī manuscript paleography is now possible. The present study aims to respond to Brough's call by tracing the development of the Kharoṣṭhī script primarily through the data made available by the new manuscripts, as well as from epigraphic and numismatic sources. It is hoped that the results will increase our knowledge of the provenance, date and internal relationships of these materials, and also increase our ability to read the many damaged and faded passages.

1.1 The Kharoṣṭhī script

The Kharoṣṭhī script is one of the two ancient writing systems of India in the historical period. Unlike the pan-Indian Brāhmī script, Kharoṣṭhī, was confined to the northwest of India, centered on the region of Gandhāra (modern, northern Pakistan and eastern Afghanistan; see map 1). The details of its origin remain obscure despite the attention of several generations of scholars, but are likely to stem from time of the Achaemenid conquest and occupation of that region from 559–336 B.C. The Kharoṣṭhī



Map 1 – Geographical extent of the Kharoṣṭhī script

script first appears in a fully developed form in the Aśokan inscriptions of Shāhbāzgaṛhī and Mānsehrā around the middle of the 3rd century B.C. It continued to be used in Gandhāra and neighboring regions, sometimes alongside Brāhmī, until in or around the 3rd century A.D., when it disappeared from its homeland. The Kharoṣṭhī script was also used for official documents and epigraphs in the Central Asian kingdoms of Khotan and Kroraina in the third and fourth centuries A.D., and appears to have survived in the cities of the Northern silk route as late as the seventh century.[1]

[1] This date is based on the discovery of a few wooden documents written in what appears to be a form of the Kharoṣṭhī script. These documents were found together with others in the Kuchean language dating

1.2 Kharoṣṭhī paleography

The study of Kharoṣṭhī paleography began with the decipherment of the script which was accomplished through the efforts of Masson, Prinsep, Lassen, Norris, and Cunningham using the bi-script coins of the Indo-Greek and Indo-Scythian kings. These early efforts were confirmed and improved by the discovery of the Aśokan edicts.

In 1904 Bühler published the first definitive study of the script, which, though limited to epigraphic and numismatic sources, became the standard treatment of the subject for over half a century. Bühler's chart of the Kharoṣṭhī script continues to be of value as, unlike all subsequent works up to and including Dani 1963, the letters are facsimiles of actually occurring forms rather than eye copies, which can vary greatly in their accuracy. Subsequent works treating the field as a whole include Das Gupta's *The Development of the Kharoṣṭhī Script,* which, though deeply flawed, "has some merit as an industrious compilation of the opinions of earlier scholars, and to this extent provides a convenient bibliographic guide" (Brough 1959: 593), and Dani's chapter on the Kharoṣṭhī script (1963: 251–272) which includes the first real attempt to treat manuscript paleography as a separate sub-area within the wider field. However, owing to the limited manuscript sources available at that time (the Niya documents and the KDhp), it is very much a preliminary effort.

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between 618 and 647 A.D. However, since the script and language of these documents has not yet been studied in detail, this attribution remains provisional; see Harmatta 1994: 437 and Salomon 1998a: 47.

A few paleographic studies have focused on particular documents or sets of materials. Rapson catalogued the script of the Niya documents in "The Kharoṣṭhī Alphabet of Chinese Turkestān" (in Boyer, Rapson, and Senart 1920-9: 295–322), including a reliable chart (plate 14) of this form of the script. Konow summarized the main paleographic features of the inscriptions in his *Kharoṣṭhī Inscriptions with the Exception of those of Aśoka* (1929: cxix–cxxvii). Brough included many valuable paleographic comments in his introduction to *The Gāndhārī Dharmapada* (1962: 55–79), but did not give a complete description or even a chart of the script of the KDhp. Most recently, my own paleographic treatments of the scripts of two BL fragments aim to make full use of the extra information now available from the manuscript forms (Salomon 2000: §5.1–8 and Allon forthcoming).

Although the hardness of epigraphic records allowed the earliest examples of the Kharoṣṭhī script to survive, this same quality obscures the finer details of the writing process, such as the number, direction and order of strokes. Such details are clearly observable in the manuscripts, enabling us to trace the developments and changes in the script far more closely than is possible merely on the basis of the overall shapes of the letters.

Another subtlety of the manuscript style are the flourishes or 'foot marks' placed at the end of vertical stems. These appear in a wide variety of forms and in complex

patterns of association with particular letters and syllables (see table 1). Foot marks do occur in epigraphic records, but, they are less varied and can often be confused with other signs, both by a second engraver (Falk 1998a: 88) or by a modern editor (Fussman 1993: 99–101 n. 68).

1.3 Sources

The primary focus of this study is the small number of manuscript hands whose work is, at present, best known to us, namely the work of scribes of the BL manuscripts which have already been published or are currently under preparation: BL scribe 1, Allon forthcoming (see Appendix B, table 2); BL scribe 9 Salomon 2000 (table 3); and BL scribe 21, Cox forthcoming (table 4); the scribe of the KDhp, Brough 1962 (table 5); and the scribe of the Mahāparinirvāṇa-sūtra fragments in the Schøyen collection, Allon and Salomon 2000 (table 6). A second hand from the Schøyen collection has been studied in detail, as it represents a particularly idiosyncratic form of the Kharoṣṭhī script (table 7).

The script of the Aśokan Rock Edicts at Shāhbāzgaṛhī and Mānsehrā has been studied here mainly on the basis of Bühler's chart (1904: table 1), which is itself based on facsimiles of rubbings of the edicts. Forms not occurring there have been taken directly from the plates published in Hultzsch 1925.

The script of the Niya documents has been studied on the basis of Rapson's chart (Boyer, Rapson, and Senart 1920–9: plate 14). This has been used for convenience sake

as it is a reliable indication of some of the actual forms, although they are not direct copies. Forms not found in this chart have been supplied, wherever possible, from the published plates.

Examples from each of the above sources, when they occur, are given in a small table preceding the discussion of each letter, to provide a graphic summary of the development of the script. Examples from the full range of available Kharoṣṭhī materials have been given in the detailed discussions when they illustrate features not exemplified in any of the main sources.

The following primary sources have been used:

1.3.1. Inscriptions

The Aśokan rock edicts in Kharoṣṭhī from Shāhbāzgaṛhī and Mānsehrā: Hultzsch 1925: 50–84, 9 plates.

Inscriptions discovered prior to 1929: Konow 1929, plates 1–36.

Inscriptions discovered since 1929[2]:

Ramaka dedication, Azes year 74: Fussman 1980a: 5–7, 18–21, plate 3.

Senavarma, King of Oḍi: Bailey 1980: 22–29, 1 plate; Fussman 1982: 1–46; Salomon 1986: 261–293, fig. 1.

[2] Inscriptions have been referred to when they contain paleographic features not found in the manuscripts, or when they can be used to date a particular development. Only those inscriptions quoted have been included here; for a more complete listing see Neelis 1992: 78–81 and Salomon 1998a: 328–349 (this list also includes inscriptions in other scripts).

Traṣaka reliquary, Azes(?) year 56: Fussman 1985: 35–42, plates 6–8.

Aśo-Raya inscribed Buddha: Bailey 1982: 149–50, plates 2–3.

Bajaur casket: Majumdar 1937a: 1-8, plates 1–3; Konow 1947: 52–58;
Fussman 1993: 95–109, plates 1–3.

Śatruleka casket: Bailey 1982: 150–55, plates 4–8; Falk 1998a: 87–95.

1.3.2. Coin legends

Coins with legends in Kharoṣṭhī have been found from almost the whole chronological span of the script, including issues of the Indo-Greeks, Indo-Scythians, Indo-Parthians, Kuṣāṇas, Kṣatrapas, Audumbaras, Kulutas, Kuṇindas, Rajanyas, Vemakis and Vr̥ṣṇis. Many of these coins have been catalogued and illustrated in Gardner 1886, Hill 1906, Smith 1906, Rapson 1908, Whitehead 1914, and Allan 1936. A few Sino-Kharoṣṭhī coins (bearing inscriptions in both Chinese and Kharoṣṭhī) have been discovered in and around the site of the ancient city of Khotan. The attribution and dates of these coins are discussed, including illustrations, in Cribb 1984, 1985.

1.3.3. Manuscripts (map 2)

British Library manuscripts: a collection of twenty-nine birch bark fragments containing the work of twenty-one different scribes were reportedly found in Haḍḍa, Afghanistan, and are now kept in the British Library. These manuscripts are being

published in the Gandhāran Buddhist Texts series; see Salomon 1999, 2000; Allon forthcoming; Lenz 1999, forthcoming; and Cox forthcoming.



Map 2 – Findspots of Kharoṣṭhī manuscripts

The Senior collection: a set of birch bark fragments, exact number of fragments still undetermined, so far the work of a single scribe; perhaps also from Haḍḍa, now in a private collection in the U.K. Not yet published.

The Khotan Dharmapada is a single birch bark scroll, in several fragments, reportedly found in a cave at Kohmāri Mazār near Khotan in Chinese Central Asia (though this findspot is doubtful, Salomon 1999: 58). The surviving portions are now

kept in separate collections in Paris and St. Petersburg. Definitively studied and edited with complete plates in Brough 1962.

Schøyen manuscripts: a collection of over one hundred fragments on palm leaf, representing parts of twenty-three original manuscripts, reportedly from Bamiyan, Afghanistan; now in a private collection in Norway. See Allon and Salomon 2000.

Pelliot manuscript fragments: a set of eight palm leaf fragments found in the region of Kucha; now kept in the Bibliothèque National de France. Published with complete illustrations in Salomon 1998b.

Oldenburg manuscript fragment: A single palm leaf fragment, findspot unknown, though probably from Chinese Central Asia. Now kept in St. Petersburg. See Litvinsky 1996: 435.

Lou-Lan fragment: — A single fragment on paper from Lou-lan, current location unknown. Published by Rapson in Conrady 1920: 191.

Kharoṣṭhī documents from Chinese Turkestan: over 700 documents discovered by Aurel Stein in his expeditions to the Central Asian sites of Niya, Khotan, Endere and Lou-lan, now divided between the British Library and Delhi. These were edited and transcribed with some plates in Boyer, Rapson, and Senart 1920-9; additional plates can be found in Stein 1907, though by no means are all the documents illustrated in any

publication. Many other documents of the same type have been discovered since Stein's expeditions; see Lin forthcoming.

2.0 The Name of the Script

References: Bühler 1885; 1904: 19–24; Ludwig 1896: 68–71; Lévi 1902: 246–53; 1904a: 79–84; 1904b: Renou & Filliozat 1953: 670; Das Gupta 1958: 270–9; Dani 1963: 251; Bailey 1978: 4; Mukherjee 1981: 144–6; Mangalam 1990: 3–4; Falk 1993: 84–90; Wright 1995: 571; Salomon 1998a: 50–1.

In the nineteenth century several names were used to refer to the Kharoṣṭhī script, viz.: l'alphabet du nord-ouest, Arian Pâli, Arianische Schrift, Bactrian alphabet, Baktro-Arian, Cabulese, Gandharian, Kabulian, Kapur-di-giri alphabet, and the North Aśoka Alphabet. The name Kharoṣṭhī was first proposed by Terrien de La Couperie (1886/7: 60–1) on the basis of a list of scripts found in the encyclopedia *Fa yüan chu lin* (668 A.D.), and the Chinese translation of the Lalitavistara, which refers to a right to left script called *K'(i)a-lu-she-t'o* with the gloss 'ass-lip' (= Skt. khara-oṣṭha).

This name is found with numerous spelling and dialectical variants in the different versions of the Buddhist and Jaina script lists: *kharoṣṭī, khaloṣṭī, karottī, kharostī, kharāstrī, kharoṭṭhī* and *kharoṭṭhiyā* (Salomon 1998a: 50). Bühler chose the present spelling in his *Origin of the Kharoṣṭhī Alphabet* (1895) which effectively standardized the spelling in modern use, despite a small number of detractors, most recently Wright (forthcoming).

The debate over the etymology and origin of this term has attracted the attention of a great many scholars over the last century, but no secure conclusion has been reached.[3] Unless some new evidence comes to light that can reveal more about the origins of this name, it perhaps best to think of it as a Sanskritized form of a foreign (likely Old Iranian) term whose etymology is uncertain.

3.0 The Origin of the Script[4]

References: Thomas 1854: II.144–68; Halévy 1885: 243–301; 1895: 372–89; Bühler 1885; 1904: 19–24; Taylor 1899: 256–62; Renou & Filliozat 1953: 669–70; Das Gupta 1958: 280–90: 280–90; Dani 1963: 255–60; Fussman 1989b: 507–514; von Hinüber: 12–15, 58; Falk 1993:92–99, 103–5; 1996: 151–156; 1998a: 85–108; Norman 1993a: 239–49; 1993b: 277–281; Wright 1995: 570–1; Salomon 1995: 271–279; 1998a: 51.

Several recent publications have revived the discussion of the origin of the Kharoṣṭhī script, which had, for most of the last century, been based on Bühler's study *The Origin of the Kharoṣṭhī Alphabet.* The main point of Bühler's argument, that Kharoṣṭhī is derived from the Aramaic script, is still accepted by most authorities, but, some details of his derivation need to be brought up to date in light of the many discoveries and developments in this field.[5]

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[3] See Falk 1993: 84–90, for the details of this debate.

[4] For a complete account of the many views on the origin of the Kharoṣṭhī script up to 1990, see Falk 1993: 92-9.

[5] One area of Bühler's theory in particular that must be reconsidered is his proposed derivation of the medial vowels from Brāhmī. As according to most modern authorities, including Falk, Fussman, von Hinüber, Norman, and Salomon, Kharoṣṭhī predates Brāhmī.

Recent debate has focused on the issues of the date of the development of the script, whether before the Greek invasion of 326 B.C. (Norman, Fussman) or after it (Falk); and whether it was a gradual process (Salomon, Wright) or the work of an inventor (Falk, Fussman). In order to answer these questions, it is necessary to look once again at the details of relationship between Aramaic and Kharoṣṭhī.

Previous attempts to explain the connection between Aramaic and Kharoṣṭhī have had difficulty in accounting for the mixed results from comparisons of the sounds and graphemes of the two scripts—there are some characters which look and sound alike, some which sound alike but don't look alike, and others which look alike but don't sound alike. Falk proposed that this points to a single creator with an imperfect understanding of Aramaic:

> "jemand die Kharoṣṭhī entwickelt hat, dem man zwar einmal die Funktionsweise und die Lautewerte der aramäischen Zeichen erklärt hatte, der sich die Erklärungen aber nur teilweise richtig merkte und deshalb später einige Zeichen neu bewertete und andere neu entwarf. Nur ein Entwickler ohne profunde Kenntnis der aramäischen Schrift würde so großzügig mit dem Vorbild umgehen" (Falk 1993: 103)

Both Salomon and Wright reject this theory in favor of a gradual development between the forms of the two scripts, as, on the one hand "it is hard to imagine that someone clever enough to invent Kharoṣṭhī could have so badly misunderstood [the basic syllabary of Aramaic]" (Salomon 1995: 276) and on the other, according to Wright, the graphic similarity of some sounds is "fortuitous and secondary" (Wright 1995: 571).

Fussman has suggested that the forms of the vowel diacritics *i, u, e,* and *o* betray a phonetic awareness, and must therefore be the work of an inventor:

> "L'analyse des signes représentant les voyelles montre que ceux-ci n'ont pas été choisis au hasard. Le tracé peu différencié, en kharoṣṭhī, des marques représentant un *i* et un *e* postconsonantiques (barre inclinée placée en haut du signe de consonne) et de celles représentant un *u* et un *o* postconsonantiques (barre inclinée placée au bas du signe de consonne) montre que l'inventeur de ce système de notation savait que les point d'articulation de *i* et *e* sont voisins (voyelles d'avant), tout comme ceux de *u* et *o* (voyelles d'arrière)" (Fussman 1989b: 511).

The notion of a phonetic awareness underlying the creation of the script was first proposed by Taylor in connection with some of the aspirates (1899: 260). However, the contrast between those pairs which clearly demonstrate this feature, e.g. *ga* 𐨒 and *gha* 𐨓, *pa* 𐨤 and *pha* 𐨥, and those that don't, e.g. *ta* 𐨟 and *tha* 𐨠, *ba* 𐨦 and *bha* 𐨧[6], suggests different strata in the development of the script, the details of which will be discussed below.

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[6] Halévy (1885: 258–9) derives *tha* 𐨠 from *ḍha* 𐨜 and *bha* 𐨧 from *pa* 𐨤, whereas Bühler (1895: 60) connects *tha* and *ta* 𐨟, *bha* and *ba* 𐨦. Clearly both authors are trying to get the facts to fit their theories.

3.1 The origin of the radicals

	ʾā́lep̄	*ṣā̄ḏēh*	*dā́leṯ*	*nūn*	*bēṯ*	*yōḏ*	*rēš*	*wāw*	*ḥeṯ*	*sā́mek̠*	*záyin*	*hē*
Aramaic	[7]											
Kharoṣṭhī	*a*	*ca*	*da*	*na*	*ba*	*ya*	*ra*	*va*	*śa*	*sa*	*za*	*ha*

The Kharoṣṭhī signs for *a, ca, da, na, ba, ya, ra, va, śa, sa, za,* and *ha* present little difficulty as they can be derived more or less directly from their Aramaic counterparts, *ʾā́lep̄, ṣā̄ḏēh, dā́leṯ, nūn, bēṯ, yōḏ, rēš, wāw, ḥeṯ, sā́mek̠, záyin,* and *hē.*

	kap̄	*qōp̄*	*gímel*	*tāw*	*pēh*
Aramaic					
Kharoṣṭhī	*ka*	*kha*	*ga*	*ta*	*pa*

The letters *ka, kha, ga, ta* and *pa* do not match the Aramaic letters *kap̄, qōp̄, gímel, tāw,* and *pēh,* which show a closer resemblance to Kharoṣṭhī *ḍa, sa, ya, pa* and *a* respectively. However, if we assume that each of the forms *ḍa, sa, ya, pa* and *a* (set A) were created before *ka, kha, ga, ta* and *pa* (set B) respectively, then the letters of set B

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[7] Here and in the following tables the up to three Aramaic forms are given, as follows: the top line gives normalized forms based on the plaster texts from Deir ʿAlla, 7th century B.C. (Hoftijzer, J. and G. Van der Kooij 1976: plate 26); the middle forms are from Elephantine papyrus 11 (47.218.93), 6th century B.C. (Kraeling 1953: plate 11); the bottom line are from the Aramaic Aśokan inscriptions, mid 3rd century B.C. (Benveniste and Dupont-Sommer 1966: fig. 2).

would have to have been modified in order to differentiate them from set A. One way to account for this is that *ḍa, sa, ya, pa* and *a* precede *ka, kha, ga, ta* and *pa* respectively in the order of the Arapacana alphabet,[8] but not in the order of the Aramaic alphabet, or in the Sanskrit *varṇamālā*. This raises the possibility that if the Kharoṣṭhī alphabet was created in a single event, the Arapacana alphabet may have provided the framework.

	mēm	*lā́meḏ*	*šīn*
Aramaic	𐡌 𐡌 𐡌	𐡋 𐡋 𐡋	𐡔 𐡔 𐡔
Kharoṣṭhī	*ma* 𐨨	*la* 𐨫	*ṣa* 𐨮

The letters *ma, la* and *ṣa,* correspond in sound to Aramaic *mēm, lā́meḏ,* and *šīn,* but not in form. The forms of *la* and *ṣa* may be the result of modification in order to accommodate the vowel diacritics. However, it is strange that *ma*, which has a stem in Aramaic, does not have one in Kharoṣṭhī, thus complicating the notation of the vowel diacritics. This form raises the possibility of an intermediate, pre-vocalic phase in the

[8] The usual arrangement of the Arapacana alphabet (in Sanskrit sources) is as follows: ***a****, ra,* <u>***pa***</u>*, ca, na, la, da, ba,* ***ḍa****, ṣa, va,* <u>*ta*</u>*,* ***ya****, ṣṭa,* <u>*ka*</u>*,* ***sa****, ma,* <u>*ga*</u>*, tha, ja, śva (sva), dha, śa,* <u>*kha*</u>*, kṣa, sta, jña, rtha (ha, pha, ita), bha, cha, sma, hva, tsa (sta), gha, ṭha, ṇa, pha, ska, ysa, śca, ṭa, ḍha (sta)* (Salomon 1990: 256). For the sake of clarity I have set A are in bold face, and set B are underlined. However, it should be stressed that only portions of the Arapacana have survived in Kharoṣṭhī records, so that although it is likely that the order in ancient Gandhāra was similar if not identical to that given above, we cannot yet be certain; see Salomon 1990.

development of the script. The early variant form of *ma* with hook added to the left side (𐨨, see §2.25), is a better correspondent to *mem.*

ga 𐨒	*ca* 𐨕	*na* 𐨣	*da* 𐨡	*pa* 𐨤
gha 𐨓	*cha* 𐨖	*ṇa* 𐨞	*dha* 𐨢	*pha* 𐨥

The letters *gha, cha, ṇa, dha,* and *pha* do not correspond to sounds in Aramaic but are clearly secondary derivatives based on the associated forms *ga, ca, na, da,* and *pa*. It is also quite likely that *ja* 𐨗 and *kṣa* 𐨐𐨿𐨮 are derived from *ca*.

ṭa 𐨚	*ṭha* 𐨛	*ḍa* 𐨜	*ḍha* 𐨝

The retroflexes *ṭa, ṭha, ḍa,* and *ḍha* appear to have been newly created for Kharoṣṭhī, possibly on the basis of *tha* 𐨠. Falk considers the "rather angular outline" of these characters to be indicative of a new creation (1996: 156).

ta 𐨟	*ba* 𐨦	*ja* 𐨗
tha 𐨠	*bha* 𐨧	*ña* 𐨙

As mentioned above, the characters *tha,* and *bha,* do not appear to be derived from their corresponding unaspirated forms. Renou and Filliozat (1953: 685) propose that *tha* derives directly from *ṭēṯ*, but their derivation seems to be based a Phoenician

rather than an Aramaic archetype.[9] One explanation for this is that these forms already existed at the time when the other aspirated forms were created. It is possible that they had been created earlier in order to write Indic names in Aramaic records, and had therefore been established by the time of the formal creation of the Kharoṣṭhī script. The same may also be true of *ña*, which might otherwise be explained as a derivative of *ja* (Dani 1963: 259).

The letter *j̄a* appears in the Aśokan inscriptions with a dot above instead of a line (see §II.2.8.1). The use of a stroke not connected to the radical suggests that this character developed later than the other aspirates which derive from their corresponding unaspirated forms, perhaps because it was not recognized as a separate phoneme until the Aśokan period.

3.2 The origin of the medial vowels

Bühler believed the Kharoṣṭhī vowels were "elaborated with the help of the Brāhma alphabet" (1895: 62), despite the problem of having to account for the absence of long vowel signs in Kharoṣṭhī. Modern authorities have reversed the direction of this influence, thus making Kharoṣṭhī the first true alphasyllabary. While it is conceivable that this script type could have evolved gradually by expanding the use of *matres lectionis* in a consonantary such as Aramaic (and perhaps proto-Kharoṣṭhī), Fussman's

[9] Dani (1963: 259) has proposed the same connection, but his Aramaic archetypes are not identified and bear only slight resemblance to other published examples. See also Salomon 1998: 53.

suggestion of a phonetic awareness underlying the forms of the medial vowels (see above) implies a conscious creation.

In support of Fussman's view, we should also consider the notation of the vowel *r̥*, which in the earliest examples (see §II.1.4) consists of two lines drawn across the middle of the stem, corresponding to its place of articulation between the front vowels marked at the head of the radical and the back vowels marked at the base. The two lines themselves may be related to the sign for postconsonantal *r* (§II.3.2.3) and the *i* vowel diacritic (§II.1.2). Although the vowel *r̥* is not attested until the 1st century B.C., the existence of this phoneme was certainly known in the grammatical tradition of the northwest from Pāṇini's time (ca. 4th century B.C.), so that it not impossible that this diacritic was created at the same time as the other vowels.

3.3 Outline of the origin of the Kharoṣṭhī script

On the basis of the above analysis a multi-stage development of the script seems to be the most reasonable explanation for the various problems in the derivation of Kharoṣṭhī from Aramaic. The following scheme sets out five stages with an indication of the likely chronological span, although there could well have been some overlap between them.

3.3.1 Indo-Aramaic

Indic phonemes not found in Aramaic may have been created to write Indic names and loan words. The letters *tha, bha,* and *ña,* may stem from such a period, probably dating from between the Persian conquest in 500 B.C. until the fall of that empire in 330 B.C.

3.3.2 Proto-Kharoṣṭhī

Early attempts to write in Gāndhārī would have used the Aramaic script, probably without indicating vowels other than ʾā́lep̄ for *a*. The letters *a, ka, kha, ga, ca, ta, da, na, pa, ba, ma, ya, ra, la, va, śa, ṣa, sa,* and *ha* would have been formed in this period (sometime before 330 B.C.), either as a direct borrowings of the Aramaic signs, or after slight modification to differentiate similar forms. The letter *za* is borrowed from Aramaic, to write non-Indic names and loan words.

3.3.3 Early Kharoṣṭhī

A conscious effort to formalize the writing system resulted in the development of the vowel signs and other derived characters to complete the Indic set of phonemes. The most important development of this stage was the development of the inherent vowel *a*. The inspiration for this invention presumably results from the need to distinguish vowel quality when writing Indic languages (in this case Gāndhārī). The fact that the vowel *a* is

by far the most common vowel,[10] or because it is a neutral or central vowel, may have influenced the choice to make it the inherent vowel (see Salomon forthcoming a).

The vowels *i, u,* (possibly *r̥*), *e,* and *o,* and the radicals *gha, cha, ja, ṭa, ṭha, ḍa, ḍha, ṇa, dha, pha*, *kṣa*, *sta,* and possibly *vha* developed in this period by modifying the signs of related phonemes. The adoption of the inherent *a* vowel would have led to the development of the conjunct consonants, and probably also anusvāra. This phase dates from before the time of Alexander the Great, thus allowing time for the script to diffuse and become "co-extensive with the limits of the eastern satrapies of Persia" (Mangalam 1990: 4).

3.3.4 Kharoṣṭhī

By the time of the Aśokan inscriptions, the Kharoṣṭhī alphabet was complete. In the centuries that followed, the syllabic modifiers other than anusvāra (see §II.4) developed, viz.: superscript stroke, which appears as a dot in the Aśokan inscriptions; cauda; long vowel sign; visarga; infinitas; and virāma.

[10] In the KDhp, the longest text extant in Gāndhārī, the vowels *a, i, u, e,* and *o* occur 6730, 2090, 1363, 614, and 752 times respectively, or 58, 18, 12, 5, and 7 percent of the time.

4.0 Foot Marks (table 1)

Bühler 1904: 25(1), 27(1); Konow: cxix; Brough 1962: 65; Dani 1963: 254, 270; Falk 1993: 104f; 1998a: 87 n.4, 88; Salomon 2000: §5.4; Allon forthcoming: §5.3.

The application of various flourishes to the bottom of vertical strokes is a feature of Kharoṣṭhī that has been recognized and commented upon for some time. Though a few of these marks bear some resemblance to phonetically significant strokes such as postconsonantal *y* and *r*, and the cauda, leading some editors to transcribe them as such, their patterns of the use suggest that they are phonetically meaningless scribal embellishments.[11] For the purposes of this study, such flourishes will be called foot marks, whether they are attached to the foot of a stem or to the end of a right limb.

Some scribes use only a few different types of footmarks, attaching them to more or less every vertical (e.g. BL scribe 1; see Allon forthcoming: §5.3), some use them only sporadically (e.g. KDhp scribe, see Brough 1962: 65), and others use a complex array of footmarks, each associated with particular letters or syllables (e.g. BL 9, the Khvs scribe; see Salomon 2000: §5.4).

The origin of these foot marks is likely to be found in the "natural tendency to *hook* or *flourish* the terminals of *vertical stems*" (Johnston 1906: 253) as the pen is lifted from the writing surface. Gradually, through processes of cursivization and differentia-

[11] The fact that foot marks are not used in conjunction with the *u*-vowel diacritic, or the letters *ma* (except in the syllable *mi;* see below) and *ha* confirms that they do not have any phonetic value.

Table 1 – Comparison of Foot Marks

Type	Shape	Characters occurring with this foot mark	Texts/scribes which use this foot mark:
0		All characters ending with a stem.	All scribes
1		All characters ending with a stem, plus the *i*-vowel diacritic of *mi*.	BL 1, 9, 6, 10, KDhp, Niya, Schøyen.
2		*a, i, ḍha*.	Aśokan, BL 1, 5.
3		*ga, ja, ḍha, ta, tha, da, na, pa, sa, za*.	Aśokan, BL 8, 9, 10, 17, 21, Ramaka, Niya.
4		*kha, ga, ña, ḍa, bha, ya, ṣa*.	Bajaur, BL 8, 9, 18, 21, Endere tablet.
5		*a, i, ka, kha, ga, ca, ja, ña, ḍha, da, dha, pa, mi, ya, ra, la, va, śa ṣa, sa, kṣa*.	Traṣaka, Pāṭhyār, BL 9, 15, 20, 21.
6		*a, ga, cha, ǰa, ṇa, tha, dha, pa, mi, la, ṣa, sa*.	BL 16, 18, 19, 20, 21, KDhp, Śatruleka 1.
7		*ka, kha, gha, ḍa, ta, pha, ba, bha, ya, śa*.	BL 9, 10, 12, 18, 20, KDhp, Schøyen.
8		*ka, ca, ña, ṇa, la*.	BL 1, 9, 16, 18, Senior, Niya.
9		*ḱa, ǰa, ña, ṇa, da, pa, pha, ba, bha, ṣ̄a*.	BL 9, Kurram, Kanhiāra.
10		*ka, ca, dha, ba, ra, kṣa*.	BL 21.

tion (e.g. the use of a foot mark to distinguish between two otherwise similar radicals) the two footmarks found in the Aśokan inscriptions developed into ten distinct types by the time of the BL manuscripts.

While such marks may be phonetically meaningless, they are often helpful in determining the likely value of damaged characters where only the foot is preserved, particularly in the case of scribes who use a variety of different marks. When all of the data from the available manuscripts have been analyzed, the foot marks may also prove to be valuable in dating manuscripts and tracing relationships between scribes.

In the following classification of the foot marks found in Kharoṣṭhī documents of all periods, eleven types have been identified on the basis of pen movement, with variations in size being grouped under the same type.[12] An additional type, called "type zero", refers to any stem that appears without a foot mark, since any letter can appear with or without one of the foot marks, depending on the whim and style of each scribe. In these cases the stem may finish abruptly, e.g. *ga* 𐨒 (Bühler 8-1), or taper to a point, e.g. *ja* 𐨗 (BL 9 frame 15r 13a9).

[12] This number should be considered provisional, as different foot marks are likely to be found as work progresses and new materials come to light.

4.1 Type 1[13]

This is the most common and perhaps the oldest foot mark. It is formed by continuing the stem stroke with a hook up to the left, e.g. *a*  (BL 1 frame 28r 57-24). Although it does not occur as such in the Aśokan inscriptions, it is almost certainly the handwritten form underlying the "small stroke, rising upwards at an acute angle" (Bühler 1904: 25), since an engraver would have found it easier to add a second stroke (cf. type 2) than to make a curve out of the stem. In the Khvs-G the horizontal stroke is longer and the upward curve only slight, e.g. *vi*  (BL 9 frame 15r 32a3). A similar form prevails in the Central Asian manuscript style, e.g. *vi*  (Rapson 137). This type occurs with at least some characters in almost every known manuscript hand, from the BL collection to the Niya documents and the Schøyen manuscripts. It is also found at one time or another with every letter that ends in a straight stem.

4.2 Type 2

This type is similar to the first, but here the hook is formed with a separate downward stroke, e.g. *a*  (BL 1 frame 24r 44-13). It is first seen in the Aśokan inscriptions, where, as noted above, the two-stroke construction was a necessary concession to the epigraphic medium. Bühler suggested that this foot mark is related to

[13] In the Khvs seven types of foot marks were identified and arranged according to their frequency (Salomon 2000: §5.4). This type was referred to there as type 4.

the dot found with some characters in the Indo-Greek coins: "A cursive substitute is the very common dot, as in *ha* [(Gardner plate 15 no. 1)]; compare also *ma* [(Gardner plate 15 no. 1)]" (1904: 27). This type occurs in some BL manuscripts (scribes 1 and 5) with *a, i,* and *ḍha*, perhaps because the type 1 foot mark had become so standard that a straight stem was felt to be incomplete, and so a hook was added secondarily. The same principle is seen in the development of the head mark in Brāhmī and its derivatives.

4.3 Type 3[14]

This foot mark consists of a horizontal stroke centered at the base of the stem, e.g. ja (Bühler 12-1). This flourish may be written with a separate stroke, as in the previous example, or with a single stroke with the foot attached to the stem with a small loop, e.g. *ge* (BL 9 frame 15r 38a11), or doubling back on the left side, e.g. ga (BL 9 frame 15r 39b2). It is found in the Aśokan inscriptions on the letters *ja, ḍha,* and *tha*. It is quite common in the coin legends of the Indo-Greek period, occurring with *ga, ja, ta, da, na, pa,* and *sa*. In the BL manuscripts (scribes 8, 9, 10, 17, and 21) its use seems to be restricted to *ga*. This foot mark has not been observed in the other manuscripts with the exception of *za* in Niya document 661, and possibly also with (KDhp 39a4 [39]), which Brough read everywhere as *ǵa* (1962: 58). The same foot mark appears

[14] Type 5 in Salomon 2000: §5.4.

occasionally in inscriptions, for example on *ga, ḍha,* and *sa* in the stone inscription of Ramaka of the Azes year 74 (Fussman 1980a: 6).

4.4 Type 4[15]

This foot mark consists of a straight stroke to the right, often with a slight upward angle, e.g. *ṣa*  (BL 9 frame 15r 35a5). It is thus very similar in appearance to the postconsonantal *r* (§II.3.2.3) sign and especially to the cauda (§II.4.3), of which it may in fact be the origin (or possibly vice-versa). This foot mark probably developed through a simplification of the preceding type, since in the Bajaur casket inscription we find the related caudate forms *ǵa, ja, ta, d́a, ýa, ś̱a,* and *s̱a,* with exactly the same characters occurring with the type 3 foot mark in the Indo-Greek coins (*ga, ja, ta, da, na, pa,* and *sa*, see above). This foot mark occurs in the BL documents (scribes 8, 9, 18, and 21) with the letters *ga, ña, ḍa, bha,* and *ṣa*. It is also found with *ṣa* in document no. 661, the tablet from Endere.

4.5 Type 5[16]

This consists of a short wide stroke up to the left followed by a narrow pointed downward stroke, e.g. *cha*  (5b6), somewhat similar in form to the postconsonantal *y* sign (§II.3.2.1). It is first seen in the Traṣaka casket inscription with *sa* (see §II.3.2.1 n. 48)

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[15] Type 6 in Salomon 2000: §5.4.
[16] Type 1 in Salomon 2000: §5.4.

and occurs fairly frequently in the work of some BL scribes (9, 15, 20, and 21), though it has not yet been observed in any of the later manuscripts.

4.6 Type 6

This consists of a hook open to the right, resembling a backwards anusvāra, e.g. *ja*  (BL 21 frame 52r 53-20). It is first seen in the BL manuscripts (scribes 16, 18, 19, 20, and 21) attached to *a, ga, cha, ja, ṇa, tha, dha, pa, mi, la, ṣa,* and *sa*. In the KDhp it is found rarely with *ka* (e.g. 14c8), and then only in pāda final position (see Brough 1962: 65). In the Śatruleka casket, Falk has shown that the first engraver wrote *sa* with this foot mark, while the second engraver ignored it (1998a: 88).

4.7 Type 7[17]

This type consists of a downward hook open to the left, e.g. *ḍa*  (BL 9 frame 15r 19a3). In some hands it can resemble an anusvāra, and may therefore be related to the pseudo-anusvāra phenomenon (see §II.4.1). It is first seen in some of the BL manuscripts (scribes 9, 10, 12, and 18), and also occurs in the BL pot inscriptions, the KDhp, and some of the Schøyen manuscripts, particularly in combination with *kha*.

4.8 Type 8[18]

This consists of an upward hook to the right, the mirror image of the type 1 footmark above, e.g. *ḍi*  (BL 9 frame 15r 30b7). It differs from the type 4 foot mark in the

[17] Type 3 in Salomon 2000: §5.4.
[18] Type 7 in Salomon 2000: §5.4.

rounded shape of the stroke. It is not always possible to distinguish it from the postconsonantal *r* sign, and the distinction must sometimes be made on the basis of the etymologically expected form. Type 8 is found in the BL collection (scribes 1, 9, 16, and 18), the Senior manuscripts, and the Niya documents.

4.9 Type 9[19]

This type consists of a horizontal stroke running leftward at first, then turning downward, e.g. *ṇa* (BL 9 frame 15r 29a11). It is seen in the work of BL scribe 9 and a few inscriptions (the Kurram casket, and the Kanhiāra inscription).

4.10 Type 10

This foot mark consists simply of a dot following the final stroke of a letter, e.g. *ca* (BL 21 frame 51r 2-24). It is seen regularly in the work of BL scribe 21. Type 10 may also be related in some way to the dotted variety of the type 2 foot mark (see §4.2).

5.0 Writing Tools

References: Bühler 1888: 66, 1904: 98; Gough 1878: 18; Janert 1995: 87–8; Salomon 2000: §5.1; Allon forthcoming: §5.1.

The ink traces in the all of the manuscripts studied in detail so far are consistent with a broad-edged reed pen. This was almost certainly a reed pen, or *calamus,* similar to

[19] Type 2 in Salomon 2000: §5.4.

the writing implements known from Aramaic papyri and ostraca (Hoftijzer and Van der Kooij 1976: 31–6).

Two styles of nibs are found in the manuscripts. In the Khvs, the scribe has recut the nib every two or three lines, thus maintaining a clean nib which leaves pronounced broad and narrow lines (see Salomon 2000: 5.1). BL scribe 1, on the other hand, recut his nib less often, allowing the fibers of the reed to soften. This has resulted in the more brush-like appearance of the script, and the distinction between the thick and thin strokes is often blurred.

When a nib has just been cut the range of movement is more limited as the hardness of the nib resists being pushed upwards on the writing surface. This has given rise to a conflict between the general leftward movement of the script and the natural rightward movement of the pen, since the push strokes of a right handed scribe follow the direction of writing. As a result of this factor and the natural tendencies of cursivization, almost all letters are formed from left to right and top to bottom. For example, when writing the letter *śa* 𐨭, BL scribe 9 begins at the left of the top line draws the horizontal and then the right leg, then returns to the first position and descends to make the left leg, rather than forming the whole character with a single stroke.

It some cases older forms reflect a writing style in which the letters are formed from right to left following the direction of writing (see §II.1.2). It seems likely that such forms developed under the precursor of the broad-nibbed pen.

Two copper pens discovered in the excavations at Sirkap (Taxila), are believed to have been modeled on the reed pens of the day (Marshall 1951: 2.598). One of these was just 11cm long, suggesting that such pens may have been held by the fingertips only, without resting the shaft on the hand between the thumb and forefinger.

6.0 Methodology

Determining the number, order, and direction of strokes is the basis for distinguishing different types of a given letter. I have described the means of identifying these details in Salomon 2000: 55:

> "[the number, order, and direction of the strokes] can be discerned in most cases from such features as the ink flow, which is thicker at the onset and thinner toward the end of the stroke; from contact and exit marks, since the points of contact and exit of the pen leave distinctive marks; and from the transition between thick and thin strokes, which can indicate the direction of the pen movement."

In addition to this kind of analysis, the details of letter construction are informed by an awareness of the general principles of cursivization and experience gained from practice in recreating these letters.

Just as the invention of photography and mechanical means of reproduction revolutionized Latin paleography in the 19th century, the technological advances of the 20th century have reshaped the field as a whole: "palaeography, which is an art of seeing and comprehending, is in the process of becoming an art of measurement" (Bischoff 1990: 3). Letter forms can now be lifted directly from computerized images of the manuscripts and copied into a chart or text, thus eliminating the constant need for rechecking, which is the bane of eye-copied charts such as those found in Das Gupta 1958. It is also now much easier to insert examples of particular characters into the text, so that the reader does not have to constantly turn from the text to the charts in order to follow the discussion.

A few words on the method of selecting exemplars illustrated in the tables may be helpful. Individual characters have been selected to be as representative as possible of the forms of that letter written by each scribe. In some cases several examples of the same character will be given, showing the range of types written by that scribe. Common characters have been chosen more or less at random, whereas the rare forms were selected after comparing all of the available examples. In a few cases where only one damaged example of a given character is preserved, slight restorations have been made to the computerized form; where the damage is extensive, only the remaining portions of the sign are given and the character is marked with an asterisk. All characters quoted in the

text appear with a full reference. References for the sample characters given in the small tables preceding the discussion of the individual letters may be found in the corresponding charts in Appendix B.

Part Two

1.0 Vowels – Independent and Medial Forms

1.1 *a*

Aśokan	BL 1	BL 9	BL 21	KDhp	Niya	Schøyen 1	Schøyen 2
𐨀	𐨀, 𐨀	𐨀, 𐨀	𐨀	𐨀, 𐨀	𐨀	𐨀	𐨀

References: Halévy 1885: 252; 1895: 385; Bühler 1895: 53–1; Boyer, Rapson, and Senart 1920–9: 297; Salomon 2000: §5.5.1.1.

This letter appears in a consistent form from the earliest records in the Aśokan inscriptions until the latest examples in the Niya documents and the Kharoṣṭhī fragments of the Schøyen collection. The independent vowel *a* is derived from the Aramaic *ʾā́lep̄* of about the 5th century B.C. (Bühler 1895:53–1). In contrast to the Aramaic three stoke form, e.g. 𐡀 (Hoftijzer and van der Kooij 1976: 60, plate 26) the Kharoṣṭhī *A* is formed in all known cases with a single stroke that begins at the top left, forms the top hook and descends to make the stem.

There are two varieties of the independent vowel radical; the first has an open head (as in all the examples above), which is the usual form throughout the whole period of the Kharoṣṭhī script. The second type has a closed head and has so far been observed only in a few manuscripts in the BL collection, e.g. 𐨀 (BL 5 frame 7v 2-7). Both types occur in BL fragment 4, e.g. 𐨀 (BL 6 frame 10r 11-10), 𐨀 (BL 6 frame 8v E3-13).

Besides these two distinct types, the manuscripts show some variation in the degree of rounding in the head and stem. The slightly hooked head, e.g. (BL 9 frame 15r 36b1), is likely to be the older form as it is similar to the Aśokan type, which is in turn is closer to Aramaic *ʾā́lep̄*. The rounded head, e.g. (BL 21 frame 51r 3-14), is probably a later development, but earlier than the closed head type, and may have evolved in order to differentiate *a* from *va* (BL 9 frame 15r 4a6, see §2.30). The straightness of the stem varies from the formal vertical style of the Niya documents and the KDhp to a rounded cursive form, e.g. (BL 4 frame 19r C3-13). In the Schøyen collection it appears in a bulb or question-mark shape in the work of scribes 1 and 2. In Document 661, the tablet from Endere, there is one instance of this letter with an acute head, (Boyer, Rapson, and Senart 1920–9: plate 12 661 2-27). Although this type of head has been observed in inscriptions, e.g. (EI 24 A-12) and (Konow plate 8 C-2), these are all likely to be miswritten/engraved attempts to form the normal rounded head.

Unlike the scripts of the Brāhmī family[1] the independent *a*-vowel acts as the vowel carrier for all the other independent vowels: “The initial form of *a*… serves as the basis from which all the other initial vowels are made by the addition of diacritical

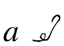
[1] There are a few notable exceptions to this: *o* ओ and *au* औ in Devanagari, which date from the 13th-14th century A.D. (Halévy 1895: 385); *e* એ, *ai* ઐ, *o* ઓ and *au* ઔ in Gujarati; and *i* ཨི, *u* ཨུ, *e* ཨེ, and *o* ཨོ in Tibetan. Khotanese uses *a* as a vowel carrier with the usual vowel diacritics to represent the other vowels, see Hoernle 1916: xvi–xvii.

marks; and these are similar to those which indicate the same vowels when attached to consonantal radical signs” (Boyer, Rapson, and Senart 1920–9: 297).

Since all consonant radicals are considered to include an inherent *a* vowel, there is no medial or final form of this letter.

The following foot-marks occur with the independent vowel *a*:

type 0	 (BL 9 frame 15r 5a3)
type 1	 (Rapson 1)
type 2	 (BL 1 frame 24r 44-13)
type 5	 (BL 9 frame 15r 36b1)
type 6	 (BL 19 frame 43r D2-6)

This letter occurs with an exaggerated form of the type 5 foot mark in the Sui Vihār copper-plate inscription of the year 11, *a*  (Konow plate 26.1 2-1). Konow, Lüders and others struggled to make sense of the loop at the base of the letter which closely resembles the postconsonantal -*y*- (see §I.4.5, II.3.2.1). Konow transcribed it both as ^{a}*ya* and *aya*, (1929: 139), but in light of the evidence from the manuscripts, we can safely assume that only the independent vowel *a* is intended here (the confusion in this case may equally be on the part of the engraver, see Falk 1998a: 88).

In addition to the forms with anusvāra and visarga (see §4.1, §4.5 below), three modified forms of this character have been observed in the Kharoṣṭhī corpus.

1.1.1 *ā*

BL 2	KDhp	Niya	Schøyen 2

References: Rapson 1905: 211–5; Boyer, Rapson, and Senart 1920–9: 298–9; Konow 1929: cxx; Brough 1962: 79, 258; Salomon 1999: 123.

Vowel-length is not usually marked in Kharoṣṭhī, but in a few cases, such as the Sanskritic texts among the Niya documents, a long vowel is sporadically indicated by a diagonal stroke drawn down to the right. This may be formed as a separate stroke from the midpoint of the stem, e.g. (BL 2 frame 7v 3-5), as a continuation of the down stroke of the stem, e.g. (KDhp 269b10 [325]), or as a separate stroke at the base of the stem, e.g. (Rapson 3). The first of these examples is likely to be the oldest record of the long vowel mark, as the three early occurrences cited by Konow (1929: cxx) can no longer be understood as long vowel signs: *sā* (Konow plate 22 2-23) of the Jamālgaṛhī pedestal should be read as *spa*, (compare *spa* , Salomon 1986: 285); the mark at the base of *kā* (Konow plate 31.1 2-11) of the Shakardarra inscription is possibly a type 8 foot mark, (compare *ka* , Senior 20r 5-34); and the hook at the base of *rā* (Konow plate 36 2-1) in the Pāṭhyār inscription is likely to be a type 5 foot mark, (compare *ra* , BL 21 frame 51r 3-23). See also §4.4 below. The discovery of the long vowel sign in the BL

manuscripts casts considerable doubt on Harmatta's hypothesis that Kharoṣṭhī spread to Niya and Lou-lan along the Silk Route from Termez (Harmatta 1994: 435).

1.1.2 *a͚*

Niya
bha͚

This letter has so far only been found in the Niya documents, frequently in No. 511 and sporadically elsewhere in that collection. It consists of a figure eight lying on its side beneath the character. Rapson suggested it may represent a modified vowel sound (Boyer, Rapson, and Senart 1920–9: 299), but could not offer a more specific value. Its use in document 511 is confined to a few words: *upala͚bhi, la͚dhva, sa͚tamasya* and *subha͚dra*. This mark also occurs in conjunction with the *u* vowel diacritic; see *u͚* §1.3.2 and §4.6 below.

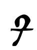
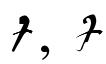
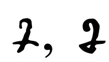
1.1.3 *ȧ*

Niya		
kȧ	*dȧ*	*śȧ*

This sign is known from only one document, no. 661, the oblong tablet from Endere, and occurs only in medial or final position. It consists of a single dot placed above the character and occurs in the following syllables: *kȧ*, *ǵȧ*, *tȧ*, *dȧ*, *drȧ*, *lyȧ*, *vȧ*, *śȧ*, *ṣȧ*. According to Rapson (Boyer, Rapson, and Senart 1920–9: 299), it is the equivalent of

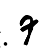
both *e* in Sanskrit and *e* = *aya* in the Prakrit of the Niya documents. Since the normal *e*-vowel diacritic is only found with *ce*, *re*, *s̱.e*, and *rse* in this document, it is possible that this dot is a cursively reduced form of the *e* diacritic rather than representing a modified form of the vowel. A similar range of notation of the e-vowel diacritic is seen in the Senior manuscripts, see §1.5 below.

1.2 *i*

Aśokan	BL 1	BL 9	BL 21	KDhp	Niya	Schøyen 1	Schøyen 2
							

References: Bühler 1895: 62; 1904: 26, 28: Boyer, Rapson, and Senart 1920–9: 297; Konow: cxx; Salomon 2000: §5.5.1.2.

In the normal Aśokan form of the independent *i*-vowel the diacritic crosses the stem at an slight angle near the shoulder. But already by the time of the Indo-Greek coins (2nd–1st B.C.), the diacritic has become a horizontal line through the middle of the stem. This attitude and position continues to be the norm throughout the rest of the Kharoṣṭhī period.

There are four types of *i*. The first is the Aśokan type, in which the vowel diacritic is a diagonal line through the upper half of the stem, e.g.  (Bühler 2-1). This type has not been observed in the manuscripts. The second type is also a two stroke form, in which the *i*-diacritic is added as a separate horizontal stroke from right to left across the middle of the vowel radical, e.g.  (BL 9 frame 15r 19a4). As this stroke

follows the direction of writing, it tends to be longer than the third type which is exactly the same, except that the direction of the stroke is left to right e.g. (BL 9 frame 15r 37a3; see Salomon 2000: §5.5.1.2). The right-to-left type is probably the older of the two, though in practice it is often difficult to determine the direction of the stroke. The fourth type is formed with a single stroke looping around to the left to start the cross bar, e.g. (BL 7 frame 13v 6-12).

The crossbar varies from a straight line, e.g. (BL 1 frame 24r 35-17), to a cursive rounded form, e.g. (Schøyen 115b 4-9). The *i* also occurs with a closed head, e.g. (BL 12 frame 22r 33-29). It is interesting that the scribes who write the closed head for the independent *a*-vowel (scribes 5, 6, 7, and 17) tend to write the open head in combination with a vowel diacritic. This is in keeping with the general rule that diacritically modified forms are more conservative, except when the diacritic itself is part of a cursively reduced form.

This character is found with the following foot-marks:

type 0	(BL 21 frame 52v 93-29)
type 1	(Rapson 4)
type 2	(BL 5 frame 7v A1-6)
type 5	(BL 20 frame 54v 10-10)

In medial position the *i*-vowel diacritic crosses the head of the letter, usually on the left side, e.g. *ki* (BL 9 frame 15r 38a1). In a few cases the diacritic is separated from the radical, e.g. *ṇi* (BL 1 frame 28r 64-10). In combination with some letters the vowel is written as a vertical line through a horizontal top or limb, e.g. *śi* (BL 1 frame 24r 22-28) and *pi* (BL 1 frame 24r 26-17). In the Senior collection the scribe also writes *pi* with the diagonal *i* vowel, e.g. (Senior 8r 6-3). Two common exceptions to the head placement are *ni* (BL 21 frame 52r 53-18) and *hi* (BL 1 frame 24r 41-5) where the diacritic is placed in the same position as the independent vowel form. Both of these syllables occur in a cursivized single stroke type, e.g. *ni* (BL 21 frame 52r 54-4), and *hi* (BL 1 frame 24r 50-4). In the Niya documents the syllable *ñi* may also take the horizontal diacritic, e.g. (Rapson 54). The combination *mi* is sometimes written with a foot mark attached to the base of the *i*-vowel diacritic:

type 0	(KDhp 20d5 [20])
type 1	(BL 1 frame 24r 18-10)
type 5	(BL 9 frame 15r 39b10)
type 6	(BL 21 frame 51r 28-26) [2]

[2] This character is also found in the Śatruleka casket, e.g. (2-25) see Falk 1998a: 87–8; Salomon 1984: 110; Bailey 1982: plate 4.

1.2.1 *ī*

Niya	Schøyen 2
tī 	*sī* 

No example of this letter has been found as an independent vowel, but it occurs in medial position in the Niya and Schøyen documents. In both of these cases it is indicated by adding to the normal *i*-diacritic the same vowel lengthening mark used to denote *ā* (see §1.1.1 and §4.4).

1.3 *u*

Aśokan	BL 1	BL 9	BL 21	KDhp	Rapson	Schøyen 1
						

References: Bühler 1895: 62; 1904: 26, 29; Boyer, Rapson, and Senart 1920–9: 297; Konow 1929: cxix, cxx; Falk 1998:88n.5 f.; Salomon 1998:55; 2000: §5.5.1.3.

There are two distinct types of the independent *u*-vowel. The first type consists of a leftward stroke at the base of the character, e.g.  (Bühler 3-1). It is found in the Aśokan inscriptions and other early coins and epigraphs up to the Indo-Parthian period, for example in the Takht-i-Bāhī inscription, *du*  (Konow plate 12.1 5-11). This archaic type is not found in any of the manuscripts. The second type consists of a closed loop at the base of the stem, e.g.  (BL 1 frame 25r 8-6). This type begins to appear during the Indo-Scythian period and becomes the standard form throughout the later history of the script. Occasionally a scribe will not completely close the loop, e.g.  (KDhp 322d8

[403]). In the cursive style of the Senior scrolls the scribe has sometimes made the loop of the *u*-vowel so narrow that it almost disappears into the stem, e.g. (Senior 20r 8-18).

No example of the closed head type has been seen in combination with this vowel. This character does not appear with a foot mark, as the base of the letter is taken up by the vowel diacritic.

The two types of the medial *u*-vowel correspond to the two independent forms, e.g. *gu* (Bühler 8-3) and *gu* (BL 9 frame 15r 28b1). The latter type sometimes has a triangular shape, e.g. *gu* (BL 3 frame 18r 4-6). In addition to these types, the medial *u*-diacritic takes two other forms in combination with certain characters. The first of these is a circle or semi-circle to the left of the base of the consonant, e.g. *hu* (KDhp 133c5 [184]) or *hu* (KDhp 46b2 [96]). It may also occur as a hook to the left from or near the stem, e.g. *hu* (Rapson 166). This form, which is particularly associated with the Niya documents, may easily be confused with the *o* diacritic: "As a rule, the stroke denoting *u* is shorter than the stroke denoting *o*, and it is often merely a short curve" (Boyer, Rapson, and Senart 1920–9: 298). This type occurs in the syllable *hu*, or when the end of the stem of another consonant is taken up with another consonantal element: after postconsonantal -*r*- and -*v*-, e.g. *vru* (KDhp 23c2 [23]) and *tvu* (KDhp 9d3 [9]); after pre-consonantal *r*-, e.g. *rsu* (Rapson 218) and anusvāra, e.g. *puṃ* (Rapson

101). In these ligatures the stem of the syllable is taken up with the subscript consonants, and so it is not free to form the normal loop of *u*. The fourth type of *u* occurs only in combination with *m*-. In the Aśokan inscriptions it appears as a leftward stroke at the top of the left arm, e.g. *mru* (Bühler 29-5; the extension on the right arm is the post-consonantal -*r*- mark, see §3.2.3). The combination *mu* later developed a specialized ligature, e.g. (BL 9 frame 15r 36b6). The transition must have taken place around the middle of the 1st century B.C.,[3] as both types are found in the Bajaur casket inscription for the last and first times respectively: *mu* (EI 24 D-49) and *mu* (EI 24 D-100).

1.3.1 *ū*

Niya
pū

This letter has not been found as an independent vowel. It occurs in medial position only in the Niya documents. It is indicated by the same vowel lengthening mark used to denote *ā*, plus the normal *u*-diacritic. See also §4.4 below.

1.3.2 *u̫*

Niya

[3] Fussman considers the three inscriptions 2, 3, and 4 to be quasi contemporaneous although they form three separate texts (1993: 102).

The vowel modifier ∞ noted above with *a͚* (§1.1.2) is also found in combination with both medial and independent forms of the *u* vowel. As in the case of *a͚*, its value is uncertain. In document 511 it appears in the following words: *u͚tama*, *u͚ktama*, *bu͚[–]*, *viśu͚dha*.[4] See also §4.6 below.

1.4 *r̥*

Vr̥ṣṇi	BL 20	KDhp	Niya
vr̥ 	*kr̥* 	*sr̥* 	*r̥* 

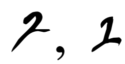
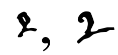
References: Boyer, Rapson, and Senart 1920–9: 298; Burrows 1937: 2; Brough 1962: §57.

This vowel was first observed in the Niya documents, and has since been identified in the coins of the Vr̥ṣṇis, the KDhp and the BL manuscripts. There are two types. The first consists of two horizontal bars across the stem of the radical, e.g.  (Allan 1936: plate 16 no. 5). This form is first found on a Vr̥ṣṇi coin dating from the first century B.C. (Allan 1936: clvii). The second type is a cursive development of the earlier form, in which the two lines are joined together by a third forming a zigzag, e.g. *kr̥*  (Rapson 13). This type is first attested in the KDhp.

There seems to be no difference between the independent and medial forms of this diacritic, with the exception that in a few forms the diacritic is written beneath the character, e.g. *mr̥*  (Rapson 117).

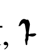
[4] No examples of the medial forms have been given as the examples are not well preserved in the published photographs.

1.5 *e*

Aśokan	BL 1	BL 9	BL 21	KDhp	Niya	Schøyen 1	Schøyen 2
							

References: Bühler 1895: 62; 1904: 26; 28; Boyer, Rapson, and Senart 1920–9: 298; Konow: cxx; Salomon 2000: §5.5.1.4.

There are four varieties of the independent *e*-vowel. The first, written with two separate strokes, has the diacritic attached to the head of the letter, e.g.  (Bühler 4-2). The second, also written with two strokes, takes the vowel mark on the right side, e.g.  (BL 1 frame 24r 38-1). The third is written with a single stroke which forms the radical and then doubles back in a slight curve to the right from the stem., e.g.  (BL 1 frame 28r 55-17). The fourth type is similar to the third, but the diacritic takes on a pronounced curve, e.g.  (Schøyen 61a C1-5).

The first of these types is the usual form in the Aśokan period and is last seen in the Kala Sang inscription of the year 100 (early 1st century A.D.),  (Konow plate 11 1-2). The second type occurs throughout the history of Kharoṣṭhī, apparently being first attested in the Aśokan edict at Shāhbāzgaṛhī,  (RE IV 9-21). This reading was proposed by Das Gupta (1958: 3) but disputed by Dani (1963: 260). In view of the poor condition of the surface at this point, which is liberally flecked with dots, it does not seem possible to make a final determination on this character.

The third type is first seen in the Takht-i-Bāhī inscription of the year 103 (Konow plate 12.1 5-1) and throughout the BL manuscript collection, e.g. (BL 9 frame 15r 26c11). The fourth type is first seen in the BL manuscripts, e.g. (BL 21 frame 52v 78-19) and occurs in inscriptions and other manuscripts from the Kuṣāṇa period onwards.

This character is sometimes written with a closed head, e.g. (Schøyen 44v A3-37). Scribe 18 in the BL collection writes the third type with an extended diacritic, (BL 18 frame 39r D2-28). The one-stroke type may have a loop connecting the stem to the diacritic, e.g. (Senior 19r 13-16), with the result that it becomes difficult to distinguish it from the single-stroke *i*-vowel (KDhp 113b2 [163]), and an over-extended *u*-vowel (BL 12 frame 22r 25-11).

This character is found with the following foot marks:

type 0	(BL 9 frame 15r 33d1)
type 1	(BL 4 frame 21r 17-24)

In medial position, the *e*-vowel diacritic is normally attached at or near the head of the radical, e.g. *ce* (BL 1 frame 25r 4-12). The letters *ny-*, *d-* and *n-* take the diacritic in the middle of the right side of the stem, e.g. *ne* (KDhp 66a4 [118]). There are a few rare cases of the vowel extending from the base of the stem, e.g. *ke* (KDhp 4d3 [4]), and *de* (BL 21 frame 51r B-2-6). Rapson has also identified a few cases

where the diacritic is attached to the left side of the stem in certain compound akṣaras, e.g. *lme* (Rapson 222), *mǵe* (Rapson 208).

The size of the *e*-vowel diacritic varies from quite large, e.g. *ve* (KDhp 126d6 [177]), to little more than a dot above the letter, e.g. *ce* (BL 9 frame 15r 37a10). The latter form is particularly common in the Senior manuscripts, see also *ȧ* §1.1.3 above.

Some scribes write the syllable *he* with the vowel mark extending rightward at first and then straight upwards, e.g. (BL 9 frame 15r 1b3). There are two conventionalized forms of the *e* vowel in medial position. The first is a cursive form of *me*, (BL 9 frame 15r 29b2) in which the right arm of *m* has curled back on itself to form the diacritic. This form is seen in some of the manuscripts in the BL collection as well as the Niya documents. The second is an abbreviated form of *de*, (Rapson 88), observed only in the Niya documents.

1.5.1 *ai*

Niya	
tai	*śai*

The *vr̥ddhi* diphthong *ai* is written by combining the normal vowel lengthening mark with the e-vowel diacritic. This form has so far only been observed in medial position in the Sanskritic fragments among the Niya documents. See also §4.4 below.

1.6 *o*

Aśokan	BL 1	BL 9	BL 21	KDhp	Niya
	,	,	,		

References: Bühler 1895: 62; 1904: 26; Boyer, Rapson, and Senart 1920–9: 298; Konow 1929: cxx; Salomon 2000: §5.5.1.5.

There are two types of the independent *o*-vowel. The first has a downward stroke from the middle of the stem, e.g. (BL 9 frame 15r 33a4). This is the standard form for the whole of the Kharoṣṭhī period. In the second type the vowel mark begins from the left end, slanting upward to join the middle of the stem, then extending down past the base of the letter and ending in a type 1 foot mark, e.g. (BL 9 frame 15r 19a1, see Salomon 2000: §5.5.1.5). The same BL scribe wrote an identical form of this diacritic in medial position in the syllable *ḍo*, (BL 9 frame 15r 1a11). Thus it seems to be a genuine variant rather than an anomaly.

This character is found with the following foot marks:

type 0	(BL 1 frame 28r 61-15)
type 1	(Rapson 9)

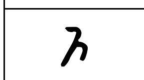
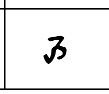
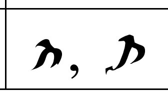
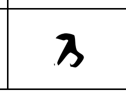
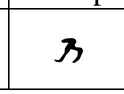
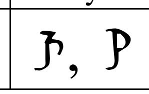
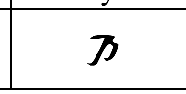
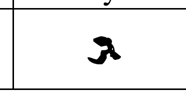
In medial position the *o*-vowel diacritic is a downward stroke from the stem of the radical, e.g. *ko* (BL 9 frame 15r 19b8). In a few cases the diacritic attached to the head of the radical, e.g. *so* (BL 21 frame 52r 59-7). In combination with the syllables *po*, *yo* and *śo*, the diacritic is written as a short vertical descending inside the character, e.g. *po*

(KDhp 145c2 [192]), *yo*  (KDhp 113b1 [163]), *śo*  (KDhp 119d2 [170]). In the work of one scribe in the Schøyen collection the vowel is formed by extending the stem stroke with a hook to the left, e.g. *no*  (Schøyen 55a A1-3).

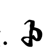
The vr̥ddhi diphthong *au* would theoretically be formed by combining the vowel lengthening mark to the normal *o*-vowel diacritic, but this vowel has not yet been observed in any Kharoṣṭhī document.

2.0 Consonants – Radical Forms

2.1 *ka* (fig. 1)

Aśokan	BL 1	BL 9	BL 21	KDhp	Niya	Schøyen 1	Schøyen 2
							

References: Bühler 1904: 27; Boyer, Rapson, and Senart 1920–9: 301; Konow 1929: cxxi; Salomon 1998:55; 1999: 116–7; 2000: §5.5.2.1.

There are four main types of *ka*. The first is made with two strokes: the head and stem are formed in one movement, then the right arm is added secondarily, e.g.  (Bühler 6-1). This type is found in the Aśokan inscriptions and throughout the Kharoṣṭhī corpus down to the Niya documents, e.g.  (Rapson 10). There are two sub-varieties of this type. In the first the right arm forms a closed loop, e.g.  (KDhp 109c3 [159]). The

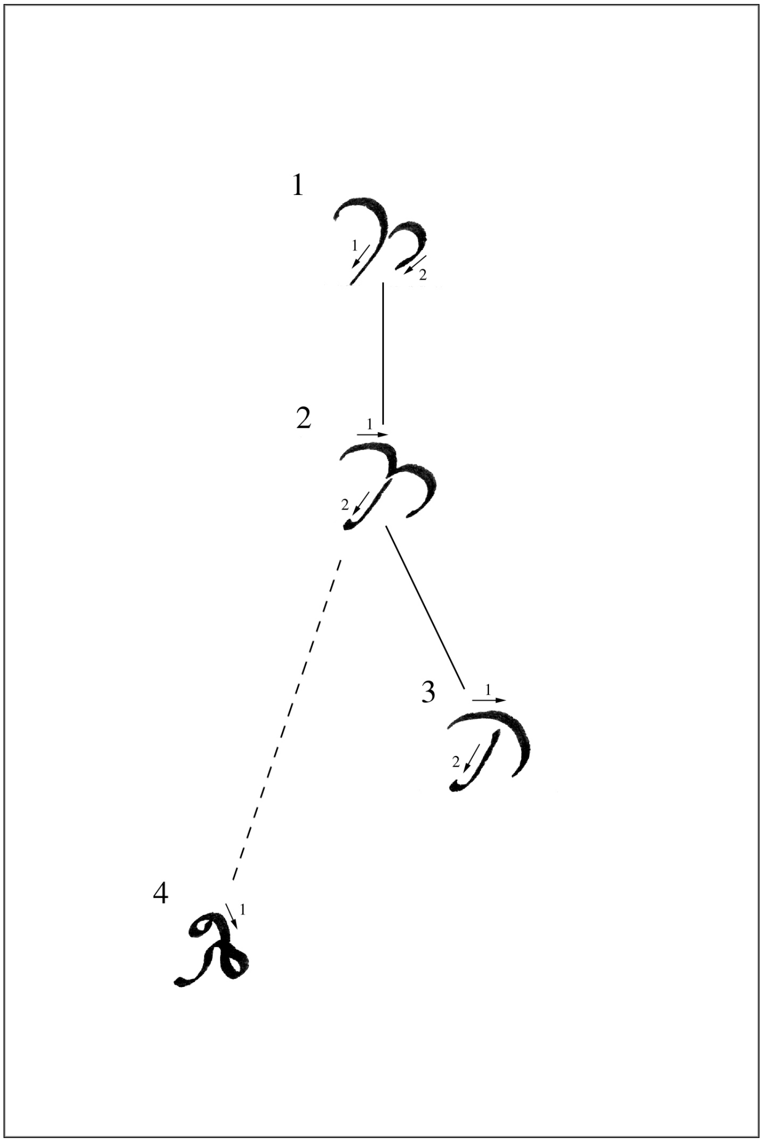


Figure 1 – Construction outlines of the four types of *ka*

second sub-variety finishes the right arm with a type 7 foot mark, e.g.  (KDhp 9d2 [9]). This form has so far only been observed in the KDhp (see Brough 1962: 56–7).

The second type of *ka*, also formed with two strokes, combines the head and right arm into a single movement, adding the stem secondarily, e.g.  (BL 1 frame 24r 32-18). This type is found in several of the BL manuscripts (scribes 1, 2, 6, 8, 9, 19, 21), the

KDhp, the Niya documents and the Schøyen collection (scribe 1). Both the first and second types occur in BL fragment 5B (see Salomon 2000: §5.5.2.1). No clear examples of this second type have been observed in inscriptions until the Mount Banj inscription of the year 102,  (Konow plate 11.2 3-12). However, it is likely that this form existed somewhat earlier, since the third type of *ka*, which must have developed out of this type, is attested in the slightly earlier Kala Sang inscription of the year 100  (Konow plate 11.1 1-10).

The third type is a cursivized form of the second type. In this case the first stroke forms a curve and the second stroke adds the stem. It is sometimes difficult to distinguish this type of *ka* from *ṣa*, e.g. *ka*  (Senior 20r 5-35) and *ṣa*  (Senior 20r 8-14). This scribe writes the first type of *ka* when it is combined with the vowel diacritics, e.g.  (Senior 8r 3-18). In the Niya documents the right side regularly curves around to meet the vertical, e.g.  (Rapson 11).

The fourth type is found only in the writing of one scribe from the Schøyen collection. It is formed with a single stroke, the stem being joined to the wavy top line by a loop at the bottom right, e.g.  (Schøyen 53a 3-5). In some cases it is written with a loop at the top left, e.g. *kā*  (Schøyen 42a 2-5). This scribe writes the second type of *ka* in the syllable *ku*, e.g.  (Schøyen 42a 3-5).

This letter is found with the following foot marks.

type 0	 (BL 9 frame 15r 18b4)
type 1	 (Rapson 10)
type 5	 (BL 9 frame 15r 33a9)
type 7	 (KDhp 9d2 [9])
type 8	 (Senior 20r 5-34)
type 10	 (BL 21 frame 51r 2-25)

2.1.1 *ḱa*

Pelliot	Niya	Schøyen 2
		

References: Boyer, Rapson, and Senart 1920–9: 301; Konow 1929: cxxi; Brough 1962: 75; Salomon 1998b: 148.

This modified form of *ka* appears in a few documents from the Kaniṣka period onwards and regularly corresponds to Sanskrit *sk*, e.g. *saṃḱara* = Skt. *saṃskāra*. It occurs in a number of foreign words in the Niya documents where it "most probably represents a non-Indian guttural" (Boyer, Rapson, and Senart 1920–9: 301). It is formed by adding a vertical stroke to the top of *ka*. The earliest record of this letter is the Kurram casket inscription of the Kaniṣka year 20,[5] where it appears twice, once with and once without a foot mark,  (Konow plate 28 B2-8) and  (Konow plate 28 B2-11). The foot

[5] Konow read *ḱa* in the Lahore writing-board inscription (1929: 130–1), which he grouped with the inscriptions of the Old Saka era. However, Salomon (1990: 263) has read this letter as *pa* and identified it as part of an Arapacana syllabary.

mark in the first example, which is unclear due to the punched style of this inscription, is probably type 9.

In Pelliot fragment 8, *ḱa* is written by adding the top mark as a third stroke to the second type of *ka* identified above. The *ḱa* of the Niya documents, (Rapson 15), is based on the third type of *ka* (see above). In the Schøyen collection, scribe 2 writes a less cursive *ḱa* (Schøyen 42b 3-3) based on the first type of *ka*, rather than his usual single stroke form, i.e. *ka* (Schøyen 42a 3-5).

This letter is found with the following foot marks.

type 0	(Salomon 1998b 8a 2-5)
type 1	(Rapson 15)
type 9	(Konow plate 28 B2-8)

2.2 *kha* (fig. 2)

Aśokan	BL 1	BL 9	BL 21	KDhp	Niya	Schøyen 1	Schøyen 2
						kho	

References: Bühler 1895: 59; 1904: 28; Konow 1929: cxxi; Brough 1959:593; 1962: 57; Salomon 2000: §5.5.2.2.

There are three separate branches in the development of this letter. All of these begin with the archaic type, e.g. (Bühler 7-1), but develop separate identities by the time of the BL manuscripts. The archaic type, characterized by the straight head and leg, is regularly found in inscriptions until the beginning of the first century A.D., e.g. Kala

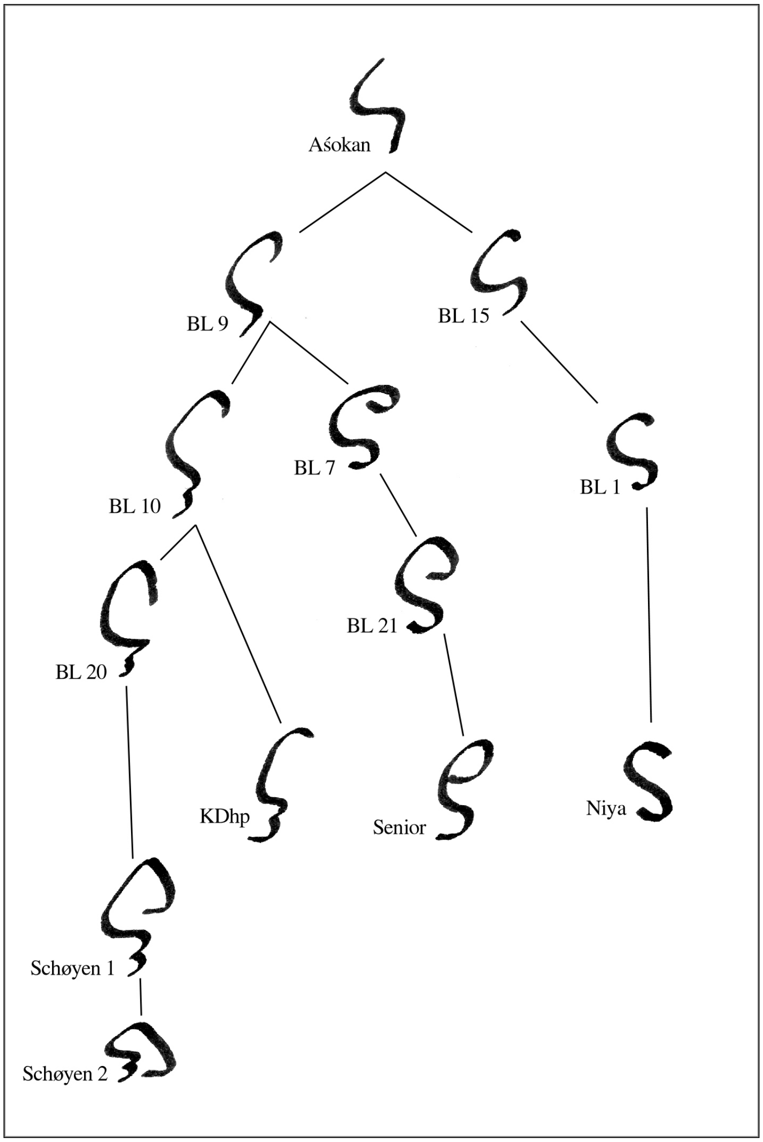


Figure 2 – Typological development of kha

Sang, Mount Banj, Takht-i-Bāhī, and occasionally in later records (Konow 1929: cxxi). In all of the later types the head of the letter is rounded to some extent. The first occurrence of the rounded head is in a coin of Antimachos from the Indo-Greek period, e.g.  (Whitehead plate 8 no. 557).

The most widely attested branch, is characterized by a rounded head (which gradually evolves into the late triangular type e.g.) and the type 7 foot mark. This is first seen in several scribes of the BL collection, e.g. *kho* (BL 10 frame 15r D2-7), (BL 12 frame 22r 17-12), (BL 20 frame 54r 5-14), and (BL 21 frame 52v 80-29). These characteristics are also found in the KDhp, e.g. (3c2 [3]); in the wooden tablet from Endere, e.g. *kho* (Boyer, Rapson, and Senart 1920–9: plate 12 661 1-20); and in the Schøyen collection, e.g. *kho* (44r A1-8) and (115a 3-13). No examples of this type have been noted in inscriptions.

The second branch developed a closed head, e.g. (Senior 20r 15-15). Although this form has so far been observed only in the Senior collection, some scribes in the BL collection show a tendency toward this type, e.g. (BL 7 frame 13v 8-7).

The third branch maintained the s-shaped form of this letter in more or less the same state which it had achieved by the Indo-Greek period, i.e. . Examples of this branch are found in the BL collection, e.g. (BL 1 frame 24r 22-20), (BL 6 frame 9r 15-12), (BL 15 frame 31v C1-39), and in the Niya documents, e.g. (Rapson 18). The forms in this branch are often found with the type 1 foot mark. This is the usual form in inscriptions from the Indo-Scythian period onwards.

This letter is found with the following foot marks:

type 0	 (BL 9 frame 15r 26d5)
type 1	 (BL 6 frame 9r 15-12)
type 4	 (EI 24 D-62)
type 5	 (BL 9 frame 15r 17d5)
type 7	 (BL 12 frame 22r 17-12)

In the hands of a few scribes, the head of *kha* rises high above the line of writing, (see Brough 1962: 57 and Salomon 2000: §5.5.2.2). This feature is particularly associated with the triangular branch of *kha*, i.e. BL 20, KDhp, and Endere (but not in the Schøyen collection). This placement is first seen in the Bajaur casket inscription (second half of the first century B.C.), the Taxila copper-plate inscription (ca. 6 B.C.) and BL scribe 9. These forms have the rounded head but not the type 7 foot mark, thus they seem to predate the formal development of the triangular branch. There are two later examples of the high placement of *kha*, the Takht-i-Bāhī inscription and the Wardak vase, neither of which have the type three foot. These may represent therefore a further branch of this letter, which developed at the beginning of the 1st century A.D.

2.3 *ga*

Aśokan	BL 9	BL 21	KDhp	Niya	Schøyen 1	Schøyen 2
						

References: Bühler 1895:53; Brough 1962: 64–5; Salomon 2000: §5.5.2.3.

The form of this letter is consistent throughout the Kharoṣṭhī period. It is formed with a single stroke starting from the top left, curving down to the right, then looping

back to the center and descending to form the stem. In a few manuscripts of the BL collection the left side of the head is bent in towards the center, e.g. (14 frame 27v 35-13); in one manuscript this has formed a closed loop (BL 4 21r-9-15).

This letter appears with the following foot marks:

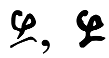
type 0	(Schøyen 44r-C-1-14)
type 1	(Boyer, Rapson, and Senart 1920–9: plate 8 511 6-31)
type 3	(BL 21 52r-66-16)
type 4	(BL 8 15r-3-9)
type 5	(BL 20 54v-11-12)
type 6	(BL 18 38v-F3-24)

Brough has transcribed several forms of *ga*, which differ only with respect to their feet, as *gga,* e.g. (, ,). This notation is qualified by the statement, "The transcription *gga* has been used merely as a method of noting the difference, and is not intended as a positive assertion of the value of the character" (Brough 1962: 64). It is likely that these forms simply represent *ga* with a foot mark (type 6), e.g. (BL 18 frame 38v F3-24), and have no special phonetic significance (see §I.4.6).[6]

This letter appears in several modified forms as follows:

[6] This character appears in the words *akadaggadi* = P *akathaṃkathī* (KDhp 47), *druggade'o* = Skt. *durgati* (51), *saggapa* = Skt. *saṃkalpa* (213), and *rasviggaha* = Skt. *raśmi-grāha* (275). Brough suggests that if the mark does represent a linguistic feature, "the doubling of the consonant is at least a possibility" (1962: 64), he also proposes reading the flourish as a misplaced anusvāra in all but the second example. While both of these suggestions are theoretically possible, I doubt if either of them represent the situation here.

2.3.1 *ǵa*

KDhp	Rapson	Schøyen 2
		

References: Senart 1914: 572–4; Boyer, Rapson, and Senart 1920–9; 301; Konow 1929: 3; Burrow 1937: 6; Brough1962: 57, 62–3; Salomon 2000: §6.2.1.1.

This form of *ǵa* is distinguished from *ga* by a horizontal stroke extending to the right at the base of the letter. It is therefore quite similar to *gra*, hence Konow adopted the transcription *g(r)a*. The consensus of opinion is that it represented a fricative pronunciation [γ] (Konow 1929: xcix; Burrow 1937: 6; Salomon 2000: §6.2.1.1). In the KDhp, however, it is equivalent to Skt. *ṅga* (Brough 1962: 64).

This form is first seen in *bhaǵavato* in the Theodoros Casket inscription, e.g.  (Konow plate 1.1 27). It is found in some documents from the BL collection, the KDhp, the Schøyen collection and the Niya documents. In the KDhp and Niya styles the rightward stroke may have a pronounced curve, e.g.  (KDhp 78c4 [130]) and  (Rapson 24). Elsewhere in the KDhp this stroke appears quite flat, e.g.  (KDhp 46c3 [46]).

Owing to the difficulties of distinguishing this character from *ga* with a type 4 foot mark, and *gra*, a thorough treatment of the incidence of *ǵa* in the manuscripts of the BL, Senior, Schøyen collections must wait until these materials have been studied in detail.

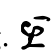
2.3.2 *ḡa*

KDhp


This form of *ga* is distinguished by a horizontal stroke above the character. Similar strokes are found in combination with *kṣ̄a, ḡ́a, c̄a, j̄a, m̄a, ś̄a, ṣ̄a, s̄a,* and *h̄a* (see each of the respective radicals and §4.2). It has so far only been observed in the KDhp, e.g. *ḡi*  (109a6 [159])[7] and the Niya documents.[8] Brough hypothesized that it may represent the velar nasal plus stop [ŋg], in contrast to *ǵa* which represents the assimilated form [ŋŋ] (1962: 64). In the Niya documents it denotes a suffixed *n* in the words *naḡa* (Skt. *nagna*) and *viḡa* (Skt. *vighna*), (Boyer, Rapson, and Senart 1920–9: 320).

2.3.3 *ḡ́a*

KDhp	Niya
	

This form of *ga* combines the rightward extension of the foot and the horizontal line above the character. It has been found in the KDhp, e.g.  (102d4 [152]) and the Niya documents, e.g. *ḡ́aṃ*  (Rapson 26). In the KDhp it is written only once in the

[7] This letter occurs once in the form *ḡa* (KDhp 153d7 [200]) but the macron stroke has been almost entirely effaced.

[8] This character occurs in document 585 cov-r 4-22, but no photograph of it is included in the plates published in Boyer, Rapson and Senart 1929 or Stein 1921.

word *saḡa* (=Skt. *saṅgha; ṅgh-* is elsewhere written with *ǵ-*), where it most likely represents an aspirated pronunciation [ŋh] (Brough 1962: 63). In the Niya documents it seems to represent a following nasal as was the case with *ḡa*, since the same name appears both as *suḡuta* and *suǵnuta*.

2.4 *gha*

Aśokan	BL 1	KDhp	Niya	Schøyen 1	Schøyen 2
	,				

References: Bühler 1895: 60; Brough 1962: 57–8; Allon forthcoming: §5.4.2.4.

The aspirated *gha* is distinguished from *ga* by a hook on the right side of the letter. Three types are distinguished with regard to the placement of the hook. In the Aśokan inscriptions it appears near to the top of the stem, e.g. (Bühler 9-1). In the KDhp it is attached to the base of the letter, e.g. (107a4 [157]).[9] In the Niya documents and the Schøyen manuscripts it is attached to the top of the stem, e.g. (Rapson 27), and (Schøyen 42a 4-9).

This letter appears with the following foot marks:

type 0	(Bühler 9-1)
type 1	(BL 1 frame 24r 38-2)
type 7	(ABSG fig. 49 2)

[9] On the distinction between *gha* and *ǵa* in the KDhp, see Brough 1962: 57-8.

2.5 **ṅa*

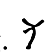
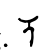
References: Boyer, Rapson, and Senart 1920–9: 314; Burrow 1937: 18.

This character was identified in the conjunct consonants *ṅka* and *ṅǵa* in the Niya documents "with some uncertainty" (Boyer, Rapson, and Senart 1920–9: 314), but this is now no longer thought to be correct. Burrow has made it clear that "[t]here was no *ṅ* in Kharoṣṭhi" (Burrow 1937: 18),[10] proposing instead to transcribe  as *tsa* not *ṅka* and  as *tǵa* not *ṅǵa* (ibid.). The akṣara transliterated *ṅsa* by Senart in his edition of the Paris fragments of the KDhp manuscript (1898: 209) should also be read as *tsa* (Brough 1962: 73). If noted at all, a nasal preceding a velar stop is always written with anusvāra, with the exception of *ǵa* in the KDhp (see §2.3.1 above).

2.6 *ca*[11]

Aśokan	BL 1	BL 9	BL 21	KDhp	Niya	Schøyen 1	Schøyen 2
							

References: Bühler 1895: 58; 1904: 25, 28; Konow 1929: cxxi; Salomon 1999: 116; 2000: §5.5.2.5.

There are four types of *ca*. The first is formed with two semi-circles, one on top of the other, the lower one open to the left and the upper one open to the top, e.g.  (Bühler 10-1). A second type, also found in the Aśokan inscriptions, is written with the two semicircles joined by a short vertical line, e.g.  (Bühler 10-3). The third type is first

[10] This situation could change as the new more Sanskritzed documents are studied.

[11] This character is transcribed as *cha* in Hultzsch 1925, Konow 1929 and most recently Dani 1963.

seen in a coin of the Indo-Greek period,  (Gardner plate 10 no. 10).[12] It is based on a single-stroke form in which the top curve is joined to the lower semicircle by a oblique stroke, e.g.  (BL 1 frame 24r 38-6). The fourth type is seen in the manuscripts of the BL and Senior collections. Here *ca* has become simplified to little more than a wavy line, e.g.  (BL 16 frame 34v 3-4) and  (Senior 20r 8-16).

This character appears with the following foot marks:

type 0	 (Bühler 10-1)
type 1	 (Schøyen 42b 1-4)
type 5	 (BL 9 frame 15r 28a4)
type 8	 (BL 16 frame 34v 3-6)
type 10	 (BL 21 51r-2-24)

2.6.1 *c̄a*

Niya	Schøyen 2
	

References: Boyer, Rapson, and Senart 1920–9: 320; Konow 1929: cxxi; Salomon 1998a: 56.

Like *ḡa* (see §2.3.2 and §4.2), *ca* also appears in some later documents with a horizontal line written above it transcribed as *c̄a*. This modified form of *ca* has been observed only in later materials, such the Niya documents and the Schøyen collection. This form regularly corresponds to Skt. *śca*, e.g. G *kac̄i* < Skt. *kaścit*. The mark above *ca*

[12] This form was transcribed as *ti* by Gardner (1886: 40), with the alternate reading *ca* given in a footnote.

in KDhp 152,  (152d5) likely to be a superlinear *ya* written as a correction as suggested by Brough (1962: 224), since it corresponds here to P *nāriyo*, and not a form of this letter.

2.7 *cha*[13]

Aśokan	BL 1	BL 9	BL 21	KDhp	Niya	Schøyen 1
						

References: Bühler 1895: 61; 1904: 25, 28; Boyer, Rapson, and Senart 1920–9: 302; Konow 1929: cxxi; Salomon 1999: 116; 2000: §5.5.2.6.

There are three types of *cha*. The first, archaic, type appears only in the Aśokan inscriptions.[14] It consists of a semi-circle open to the top on top of a cross, e.g.  (Bühler 11-1). By the time of the Mānsehrā inscription (Saka year 68), the cross bar had become rounded, e.g.  (Konow plate 11 10-2). This intermediate type, formed with three strokes, is found in several of the manuscripts of the BL collection (scribes 1, 6, 9, 12, 21) as well as the Niya documents, e.g.  (BL 9 frame 15r 5b3) and  (Rapson 35). In one manuscript in the BL collection the stem rises above the top semicircle, e.g. *chi*  (BL 12 frame 22r 16-17). The third type is a cursivized form of the second in which the

[13] This character is transcribed as *chha* in Hultzsch 1925, Konow 1929 and other works including Dani 1963. The transcription *cḱa*, found in Boyer, Rapson, and Senart 1920–9 and other early editions, refers to the character  which is now transcribed as *kṣa*, see §3.1.1 below. Dani transcribes this character as *chh'a* (1963: 261). The related character , transcribed as *c̄ḱa* in Boyer, Rapson, and Senart 1920–9, is now transcribed as *kṣ̄a*; see §3.1.1 below.

[14] The archaic type of *cha* is given in Gardner's chart of the Kharoṣṭhī Script (Gardner 1966: lxx), which is based on the coins of the Greek and Scythian Kingdoms. However, it is shown in brackets, indicating that this form is not found in the coins in the British Museum, but rather cited as occurring elsewhere on the authority of Cunningham.

top stroke has been joined to the stem, either by a loop as in (Senior 20r 10-12), or by doubling back, e.g. (KDhp 129d7 [180]).

This character appears with the following foot marks:

type 0	(Bühler 11-1)
type 1	(BL 1 frame 24r 43-8)
type 5	(BL 9 frame 15r 28a4)
type 6	(BL 18 frame 38v F2-34)

2.8 *ja*

Aśokan	BL 1	BL 9	BL 21	KDhp	Niya	Schøyen 1	Schøyen 2

References: Bühler 1895: 54; 1904: 25; 28; Konow 1929: cxxi; Salomon 2000: §5.5.2.7.

There are two types of *ja*, an older two-stroke form, and a later cursivized single-stroke form. The older type is formed with separate strokes for the left arm and the right arm and stem, e.g. (Bühler 12-1). This type found in the Aśokan inscriptions and throughout the Kharosthi period. The cursive type is first seen in a few of the BL manuscripts (scribes 1, 4, 9).[15] It is formed in exactly the same way as *ḍa*, e.g. (BL 1 frame 2r 35-7, see §2.13), starting from the top of the left arm curving down, then rising to form the right arm and descending to make the stem, e.g. (BL 1 frame 28r 59-7). The juncture between the up-stroke of the right arm and the down-stroke of the stem is

[15] The cursive type of *ja* is found in the Niya documents, but it has been transcribed by Boyer, Rapson, and Senart as *jha* (see 1920–9: 303 and *za* §2.33 below).

made either with a narrow loop, e.g. (BL 4 frame 21r 11-23), or by doubling back, e.g. (BL 9 frame 15r 32a9). This type is also seen in the KDhp and the Schøyen collection. A few of the scribes of the BL collection write both types of *ja* in the same manuscript, e.g. (BL 1 frame 24r 45-19) and (BL 1 frame 28r 59-7).

This letter appears with an unusual foot mark in the coin inscriptions of the Indo-Greek kings, which appears to be a combination of the type 3 and type 2 foot marks, e.g. (Gardner plate 6 no. 3).

This character also appears with the following foot marks:

type 0	(BL 9 frame 15r 13a9)
type 1	(Rapson 43)
type 3	(Bühler 12-1)
type 5	(BL 9 frame 15r 19a9)
type 6	(BL 21 frame 52r 53-30)

2.8.1 *j̄a*

BL 1	BL 9	BL 21	KDhp	Schøyen 1	Schøyen 2

References: Boyer, Rapson, and Senart 1920–9: 320; Brough 1962: 59–60; Salmon 2000: §5.5.2.8.

This character appears with a horizontal superscript stroke (see §4.2) in syllables corresponding to Skt. *dhy-*/ MIA *jh-*, *jjh-*, e.g. G *j̄aṇo*, = Skt. *dhyānam*, P *jhānaṃ* (Khvs-G: v. 29a). It is first seen in the BL manuscripts, and occurs later in the KDhp and the

Schøyen collection.[16] It is formed by adding the superscript line to either the two-stroke form, e.g. (BL 21 frame 52r 53-20) or to the single stroke form, e.g. (KDhp 104a7 [154]).

Brough raises the possibility that this sign appears in an embryonic form in the Aśokan inscriptions, represented by a superscript dot in place of the line (Brough 1962: 59–60), e.g. (Mānsehrā RE VI 29-10). Despite the signs of weathering, I think the reading with superscript dot is fairly secure as it is visible in all four of the legible examples[17] (see §4.2 below).

This character appears with the following foot marks:

type 0	(KDhp 104a7 [154])
type 1	(Schøyen 115a 4-15)
type 6	(BL 21 frame 52r 53-20)
type 9	(BL 9 frame 15r 29a5)

2.8.2 *ja*

Bajaur Casket	Niya

References: Boyer, Rapson, and Senart 1920–9:302; Burrow 1937: 6–7; Fussman 1993: 101.

[16] Although this character appears in Rapson's chart, (44), he notes that "this combination . . . is not, as was formerly supposed, found in the Niya documents." (Boyer, Rapson, and Senart 1920–9: 320).

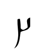
[17] The superscript dot is visible above *ja* in: *nijati* S RE VI 14, 15; M RE VI 29; and in *istrijakṣa* M RE XII 8. In *anunijapeti* M RE XIII 8 the writing is barely legible so that the presence of this form cannot be determined.

This character is first seen in the Bajaur casket inscription of the 1st century B.C., e.g.  (EI 24 B-11). It is also found much later in the Niya documents,  (Rapson 48). It is distinguished from *ja* by a rightward stroke at the base of the letter. Like *ǵa* (cf. §2.3.1), this mark seems to indicate a spirant form as *ʝ́*- regularly occurs in intervocalic position corresponding to Skt. *ś*-, e.g. G *avaǵaʝ́a* = Skt. *avakāśa* (Burrow 1937: 6–8).

2.9 *jha*

The character  has hitherto been transcribed as *jha*, on the basis of a supposed association with the Indian phoneme *jh* (Brough 1962: 60–1). Since the value *z*- is valid in almost every occurrence of this letter and *jh*- is valid only once, I have adopted *z*- for the transcription.[18] The treatment of this character follows the sibilants (§2.33).

2.10 *ña*

Aśokan	BL 1	BL 9	BL 21	KDhp	Niya	Schøyen 1	Schøyen 2
							

References: Bühler 1895: 62; 1904: 25, 28; Boyer, Rapson, and Senart 1920–9: 303; Konow 1929: cxxii; Salomon 2000: §5.5.2.9.

There are five types of *ña*. The first, found in the Aśokan inscriptions, has a hooked vertical and curved left arm, e.g.  (Bühler 14-1). By the time of the BL manuscripts this original type had developed into four further types, written with either two strokes (types 2 and 3) or a single stroke (types 4 and 5). The second type has a

[18] The transcription *z* was used by Lüders (1936: 640), Burrow (1937: 8–9), and Brough (1962: 60–1).

small hook at the top of the vertical and the normal s-shaped right arm, e.g.  (BL 1 frame 28r 56-15), the third type has a straight vertical, e.g.  (BL 9 frame 15r 6b5). The second type is likely to be the older of the two, the hooked stem having developed from the curved left arm in the Aśokan form. This type is last seen in the Jamālgaṛhī inscription of the year 359, e.g. *ñe*  (Konow plate 22 1-2). The fourth type, first seen in the work of BL scribe 18, is a single stroke from based on the third type, e.g. *ño*  (Schøyen 44r A3-10). In this type the right arm first rises to the top of the vertical, then doubles back to form the stem. In the Schøyen collection a fifth type is found in which the arm is connected to the stem with a narrow loop, e.g.  (Schøyen 115a 4-15).

Two variants of the above types have been noted. In the coins of the Indo-Greek period, the Aśokan type of *ña* is simplified so that it resembles *ḍa* , e.g.  (Allan plate 15 no. 14), and in one of the BL manuscripts the right arm of *ña* has become elongated, e.g.  (BL 6 frame 9r 20-13).

The position of the *e*-vowel diacritic seems to be more variable in the case of *ñ* than is the case with other consonants. It appears above the head of the letter, e.g.  (KDhp 46a4 [96]); on the outside of the right arm, e.g.  (Konow plate 22 1-2); below the right arm, e.g.  (BL 9 frame 15r 5a11); and at the base of the stem, e.g.  (Rapson 56).

This character appears with the following foot marks:

type 0	(Rapson 53)
type 1	(BL 9 frame 15r 6b5)
type 4	(BL 18 frame 39r D3-18)
type 5	(BL 21 frame 51v 144-7)
type 8	(Senior 5v 8-10)
type 9	(BL 9 frame 15r 38a3)

2.11 *ṭa*

Aśokan	Inscriptions	BL 1	Senior	Niya
, *ṭi*	*ṭi*			

References: Bühler 1895: 60; 1904: 25, 28; Boyer, Rapson, and Senart 1920–9: 304; Konow 1929: cxxii; Salomon 2000: §5.5.2.10.

There are five types of *ṭa*. The earliest form, found in the Aśokan inscriptions, consists of a left arm near the top of a vertical stem, e.g. *ti* (Bühler 15-3).[19] The same form appears in the Bajaur casket inscription, e.g. *ṭi* (EI 24 A-11). This type is last seen in an inscription of the Kaniṣka period "in Sui Vihār . . . the right bar seems to be missing." (Konow 1929: cxxii), unfortunately this character is not visible in Konow's plate 26.[20] The second type differs from the first by the addition of a right arm at the

[19] Since forms in combination with the vowel diacritics tend to be more conservative in later Kharoṣṭhī materials, I have assumed that the same is also true of Aśokan Kharoṣṭhī. I have therefore tentatively identified the type of *ṭ* in the combination *ṭi* as the earlier type.

[20] Dani has given this type in his chart corresponding to the period of the Niya documents, however, he gives no reference to this form and I have not been able to locate it.

mid-point of the stem, e.g.  (Dani plate 23a).[21] Perhaps this mark was added to differentiate the first type from *ja* and/or *ḍa*. Two further types have been seen in the manuscripts. The first of these is a single-stroke from, which is the usual type found in the BL manuscripts and the Niya documents. In this type the character has been reduced to a z-shape, e.g.  (BL 1 frame 4r 75-2) and  (Rapson 57). The last type has so far only been observed in the Senior collection. It is formed with two strokes, first the left arm, then the stem and right arm, e.g.  (Senior 20r 2-6)[22]. Here the right arm is little more than a curve to the right at the base of the stem.

2.12 *ṭha*

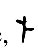
Aśokan	BL 1	BL 9	KDhp	Niya	Schøyen 1	Schøyen 2
						*ṭho* 

References: Bühler 1895: 60; 1904: 28; Boyer, Rapson, and Senart 1920–9: 304; Konow 1929: cxxii; Brough 1962: 75–7; Salomon 2000: §5.5.2.11.

There are two types of this character. The first is the standard form used throughout the Kharoṣṭhī period. It is formed with two strokes, first the head and stem, then the left arm, e.g.  (BL 1 frame 28r 53-5).

The second type is found only in the work of scribe 2 of the Schøyen collection. In this case the form has been modified so that it can be written with a single-stroke:

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[21] The form of *ṭa* given in Bühler's plate,  (15-1), should be read *tha* according to Konow (1929: cxxii).

[22] The reading of this character is slightly complicated by the fact that the expected reading here is *ṭha*, i.e. **aṭha* < Skt. *āsthā*.

beginning with the head and top of the stem, then making a loop out to the left half way down the stem, imitating the left arm of the first type, and descending to finish the stem, e.g. *ṭho*  (Schøyen 115a 2-15).

This character appears with the following foot marks:

type 0	 (BL 9 frame 15r 13b11)
type 1	 (KDhp 109a5 [159])

2.12.1 *ṭ́ha*

Aśokan	BL 1	BL 21	Niya	KDhp
				

References: Boyer, Rapson, and Senart 1920–9: 304; Brough 1962: 75–7; Allon forthcoming: §5.4.2.12.

This modified form of *ṭha* is found in the Aśokan inscriptions, the BL collection (scribes 1, 6, 7, 16, 18, 21), the KDhp, the Senior collection, and the Niya documents. It is differentiated from *ṭha* by the vertical extension added to the end of the left arm. For details on the complex phonetic relationships among this character, *ṭha*, *sta* and *tha* see Brough 1962: 75–7.

There are two types of this character, both formed with two strokes. The first is the normal type, e.g.  (BL 1 frame 4r 85-19; cf. *ṭha* above). The second type appears only in the work of BL scribe 7. At first it appears to have been formed with a single stroke doubling back from the foot to form the left arm, however, a close inspection

suggests that the left arm is formed just as in the first type, only turning downward parallel to the stem at the end of the horizontal, e.g. *ṭho* (BL 7 frame 13v 10-25).

This character appears with the following foot marks:

type 0	(Bühler 16-1)
type 1	(BL 1 frame 4r 85-19)

2.13 *ḍa*

Aśokan	BL 1	BL 9	BL 21	KDhp	Niya
					, ,

References: Bühler 1895: 61; Boyer, Rapson, and Senart 1920–9: 304–5; Salomon 2000: §5.5.2.12.

There are two types of this character. The first is a two-stroke form that appears from the time of the Aśokan inscriptions onwards. The first stroke forms the left arm, while the second adds the vertical, e.g. (Bühler 17-1). The later, single-stroke type first appears in the manuscripts of the BL collection. Here the left arm and vertical are made with the same stroke, e.g. (BL 21 frame 52r 69-19). The manuscript form of this type may easily be confused with *ja* (cf. §2.8), which may explain the adoption of one of the foot marks associated with this character (particularly types 4, 7, and 8).

This character appears with the following foot marks:

type 0	(Bühler 17-1)
type 1	(BL 1 frame 2r 35-7)

type 4	(BL 21 frame 52r 69-19)
type 7	(BL 9 frame 15r 19a3)
type 8	*ḍi* (BL 9 frame 15r 30b7)

The editors of the Niya documents distinguished a modified form of *ḍa* on the basis of the rightward extension of the foot, e.g. , (Rapson 67 and 68), and transcribed it as *ḍ́a*. This form is now identified with *ḍa* plus the type 4 or type 8 foot marks, as in the Khvs-G, both types are used interchangeably (Salomon 2000: §5.5.2.12; Boyer, Rapson, and Senart 1920–9: 305).

2.14 *ḍha*

Aśokan	BL 1	BL 9	KDhp	Niya	Schøyen 1

References: Bühler 1895: 61; Boyer, Rapson, and Senart 1920–9: 305; Salomon 2000: §5.5.2.13.

This rare character has a consistent form from the Aśokan period onwards. There are two types. The first is written with two strokes, first the head line, then the stem, e.g. (BL 9 frame 15r 38b8). The second type combines these into a single stroke, joined with a narrow loop at the top left, e.g. *ḍhe* (BL 16 frame 34v 9-20).

This character appears with the following foot marks:

type 0	(KDhp 112d10 [162])
type 1	(BL 1 frame 24r 21-2)
type 2	(Bühler 18-2)

type 3	(Mānsehrā RE VII 33-54)
type 5	(BL 9 frame 15r 38b8)

2.15 *ṇa*

Aśokan	BL 1	BL 9	KDhp	Schøyen 2

References: Bühler 1895: 61; Boyer, Rapson, and Senart 1920–9: 305; Konow 1929: cxxii; Brough 1962: 97–8; Salomon 1999: 121; 2000: §5.5.2.14, §5.9.1.

In the Aśokan inscriptions this character appears with a large hooked head, e.g. (Bühler 19-1), in contrast to the elongated s-shape of the dental *na*, e.g. (Bühler 24-1; see §2.20). After the Aśokan period *ṇa* appears with an angular head, e.g. (BL 1 frame 24r 32-5). This is the only form of *ṇa* found in the manuscripts, although the old hook-type is found in some later inscriptions, for example (Konow plate 25.2 no. 486 2) in the inscribed bricks from Shāh-jī-kī Ḍherī of the Kaniṣka era.

Soon after the Aśokan period the phonetic distinction between these two nasals became leveled with the result that the use of one or the other became a matter of scribal preference (Salomon 2000: §5.9.1). The so-called 'retroflex' *ṇa* is more common in the BL collection (scribes 1, 3, 8, 9, 12, 13, 15, 16, 17, 18) and in the Senior manuscripts, whereas the 'dental' *na* is used by some BL scribes (2, 5, 6, 7, 10, 14, 19, and 21)[23] and

[23] Scribes 4 and 20 use both the retroflex and dental nasals, though the pattern for their distribution (if any) has not yet been established.

the Niya documents. The scribe of the KDhp uses both forms in a consistent pattern as follows:

> "Initially, (*n*-) remains as *n*, while single intervocalic (-*n*-, -*ṇ*-) both appear as *ṇ* . . . Where historically a double nasal is represented, whether original, as (-*nn*-) in Sanskrit, or resulting from assimilation, the retroflex group (*ṇḍ* > *ṇṇ*) remains as *ṇ*, while in general an original dental group appears as *n*[.]" (Brough 1962: 97)

This character appears with the following foot marks:

type 0	(BL 9 frame 15r 36a8)
type 1	(KDhp 145a8 [192])
type 6	(BL 20 frame 53v 20-13)
type 8	(BL 1 frame 24r 25-17)
type 9	(BL 9 frame 15r 29a11)

2.16 *ta*

Aśokan	BL 1	BL 9	BL 21	KDhp	Niya	Schøyen 1	Schøyen 2
		,					

References: Bühler 1895: 59; 1904: 25, 28; Boyer, Rapson, and Senart 1920–9: 306; Konow 1929: cxxii; Salomon 2000: §5.5.2.15.

This character appears in all records in the same basic single-stroke form with a few slight variations. The head and leg are straight in the Aśokan inscriptions, e.g. (Bühler 20-1), but are rounded in later records, e.g. (BL 1 frame 24r 32-6). In one of the BL manuscripts the head is sometimes a closed loop, e.g. (BL 15 frame 30v E9-

19). In the Niya documents the head has disappeared, e.g. (Rapson 75). The right shoulder may be pointed, e.g. (Schøyen 44r C1-13), or rounded (BL 12 frame 22r 4-11).

The distinction between *ta* and *da* is almost lost in some later scribes, especially the Niya documents and the KDhp, e.g. *ta* (KDhp 106c1 [156]) and *da* (KDhp 106b2 [156]). Evidently this is influenced by a leveling in the pronunciation of these two letters in intervocalic position (Burrow 1937: 7–8). In the Senior collection *ta* and *da* are both written with *da* (20v 5-16) in initial position or when representing a geminate, but appear as *d́a* (20r 15-2) in intervocalic position. This distinction is not consistently observed in combination with the *i*-vowel diacritic.

This character appears with the following foot marks:

type 0	(BL 9 frame 15r 35b1)
type 1	(Rapson 75)
type 3	(Whitehead plate 4 no. 213)
type 7	(BL 9 frame 15r 38a4)

2.16.1 *t́a*[23]

Bajaur Casket
t́i 

Reference: Brough 1962: 94--6; Fussman 1985b: 37; 1993: 99--101.

This character is first seen in a few inscriptions of the 1st century B.C., but has so far not been found in any manuscripts. It is distinguished from *ta* by the addition of the same rightward mark at the base of the letter, which is used to indicate the spirants *ǵa* (§2.3.1) and *j́a* (§2.8.2).

2.17 *tha*

Aśokan	BL 9	BL 21	KDhp	Niya	Schøyen 1	Schøyen 2
						

References: Brough 1962: 75–7; Salomon 2000: §5.5.2.16.

This character appears in the same cross-shape form throughout the Kharoṣṭhī period. In some manuscripts, particularly later ones, the cross bar becomes quite curved, e.g.  (Schøyen 115a 5-10). This curve is first seen in some of the manuscripts of the

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[23] Majumdar transcribes this character as *t(r)a* (1937: 7). Brough suggested using the transcription *δ* or *θ* "Konow used the transcription *–d(r)a*, and elsewhere *–t(r)a*. It seems possible that two distinct characters should not be recognized, and the transcription *δ* is here adopted provisionally for both. If it should be desirable to separate the graphic forms, we might write *δ* and *θ*, recognizing that the two are both used as a notation for [*δ*]" (1962: 95 n. 1). In the Śatruleka casket inscription (see Falk 1998a: 87 ff.), Bailey (1982: 152) understood a fricative pronunciation and transcribed this character as *t̲a*. Salomon (1984: 110) took this mark to indicate the end of a word, and Falk read it as an embellishing hook written by the first of the two scribes, see Falk 1998a: 87. In the Traṣaka reliquary Fussman (1985b: 37) following Bailey transcribes this character as *t̲a*.

BL collection (scribes 13, 18, 20), e.g. (BL 20 frame 53v 12-6), but it is not found in the Niya documents.

This character appears with the following foot marks:

type 0	(KDhp 123d3 [174])
type 1	(Schøyen 44r C1-14)
type 3	(Shāhbāzgaṛhī RE V 11-76)
type 6	(BL 18 frame 39r C2-10)

2.18 *da*

Aśokan	BL 1	BL 9	BL 21	KDhp	Niya	Schøyen 1	Schøyen 2
					,		

References: Bühler 1895: 53; 1904: 25, 28; Boyer, Rapson, and Senart 1920–9: 306; Konow 1929: cxxii; Salomon 2000: §5.5.2.17.

There are two types of this character. The first is the normal s-shaped form which is found in all periods of the script, e.g. (BL 1 frame 25r 15-7). In the earliest records the stem is almost straight, e.g. (Bühler 22-1). The rounded foot possibly developed out of the type 1 foot mark (see §I.4.1), in order to differentiate it from *na* (Bühler 24-1).

The second type is a cursive form, which is little more than a simple curve, e.g. (Rapson 86). This form occurs in some of the Niya documents but has not been seen in other manuscripts. Another minimal form occurs in some inscriptions, for example in the Takht-i-Bāhī inscription of the year 103 (19 A.D.) where it appears as a straight line, *du*

(Konow plate 12.1 5-11) (the leftward projection at the base is the old style *u*-vowel diacritic, see §1.3).

A special ligatured form of *de* is found in the Niya documents, consisting of a c-shaped stroke, e.g. (Rapson 88).

Several minor variations to the above types have been noted. In some of the manuscripts of the BL collection the hook at the head turns inwards, forming a closed loop, e.g. (BL 4 frame 20r 40-11). In the Peshawar Museum inscription of the year 168 (84 A.D.) it has a beaked head and straight leg, e.g. (Konow plate 15.1 2-16).

This character appears with the following foot marks:

type 0	(Bühler 22-I)
type 1	(BL 1 frame 25r 15-7)
type 3	(Whitehead plate 4 no. 236)
type 5	(BL 9 frame 15r 32b3)
type 9	(BL 9 frame 15r 20a2)

2.18.1 *d́a*[24]

BL 21	Senior

References: Konow 1929: 2--3; Fussman 1993: 99--101.

[24] Konow used the transcription *d(r)a* for this character, see also note on *t́a* above.

This modified form of *da* is first seen in the Theodoros casket inscription, (Konow plate 1.1 1-15), where it has a large rightward projection at the foot. BL scribe 21 writes both *da* (52r 66-7) and *d́a* (52r 69-23), but it is not yet clear if the difference represents a real phonological distinction or whether the rightward mark is simply a type 6 foot mark. In the Senior scrolls *d́a* is distinguished from *da*, see §2.16 above.

2.19 *dha*

Aśokan	BL 1	BL 9	BL 21	KDhp	Niya	Schøyen 1	Schøyen 2
		,					

References: Bühler 1895: 60; 1904: 25; Boyer, Rapson, and Senart 1920–9: 306; Konow 1929: cxxii; Salomon 2000: §5.5.2.18.

There are two types of this character. The first has an angular shape, e.g. (BL 1 frame 24r 48-1), and occurs most frequently in the earlier inscriptions. The second, rounded type is first seen in the Indo-Scythian period, e.g. the Bīmarān vase (Konow 10.2 33). From the period of the BL documents onwards the rounded type is the more common of the two, e.g. (BL 9 frame 15r 24b7). Scribes 1, 6, 7, 16 and 20 write the angular type, while scribes 2, 4, 8, 9, 10, 12, 14, 15, 17, 18, 21 write the rounded type. Both types are found in the KDhp, e.g. rounded *dha* (107b7 [157]), and angular *dhu* (322b5 [403]). Here the diacritically modified form preserves the older type of the radical.

This character appears with the following foot marks:

type 0	(BL 1 frame 28r 68-13)
type 1	(BL 1 frame 24r 48-1)
type 5	(BL 15 frame 30r E6-16)
type 6	(BL 21 frame 52r 66-8)
type 10	(BL 21 frame 52r 43-14)

2.20 *na*

Aśokan	BL 21	KDhp	Niya	Schøyen 1

Bühler 1895: 57; 1904: 25; Boyer, Rapson, and Senart 1920–9: 306; Konow 1929: cxxii; Salomon 2000: §5.5.2.19.

There are two types of this character. The first is characterized by the stretched hook at the head, e.g. (Bühler 24-1). This is the usual type from the earliest records up to the Indo-Scythian period. The second type with a tight hook, e.g. (BL 21 frame 51r 15-26) is more common from the time of the BL manuscripts onwards.[25] In the Niya documents *na* is often written with a very small hook, e.g. (Rapson 94).

On the relationship between the retroflex nasal *ṇa* and the dental *na* see §2.25 above.

This character appears with the following foot marks:

[25] Das Gupta gives an example of the second type of *na* from the Aśokan period, (*maha**na**[sas]i* Shāhbāzgaṛhī RE 1 line 2), however, his eye copy is inaccurate and should be read as the normal first type.

type 0	(Bühler 24-1)
type 1	(Schøyen 44r C1-12)
type 3	(Gardner plate 11 no. 12)

2.20.1 *ña*[26]

KDhp

The form of *ña* with the superscript stroke, is found only in the KDhp, e.g. (92d4 [144]), where it corresponds to OIA *ndh-*. Brough suggested that it may have been pronounced as "a fully voiced *n*, with a feature of breathiness running through it" (1962: 62).

2.21 *pa* (fig. 3)

Aśokan	BL 1	BL 9	BL 21	KDhp	Niya	Schøyen 1	Schøyen 2

References: Bühler 1895: 57; Salomon 2000: §5.5.2.20

There are five types of this character.[27] The first, found in the Aśokan inscriptions, is formed with two strokes, first the stem, and then the hook which begins with a horizontal stroke out from the vertical, e.g. (BL 1 frame 24r 51-4). This is the normal form found

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[26] Senart (1898) transcribed this character as *n(d)h*.

[27] The form *pa* is given by Bühler (25-1) and is reproduced in Renou and Filliozat 1953: 685, but it has rightly been pointed out by Falk (1996: 154) that such a form does not exist.

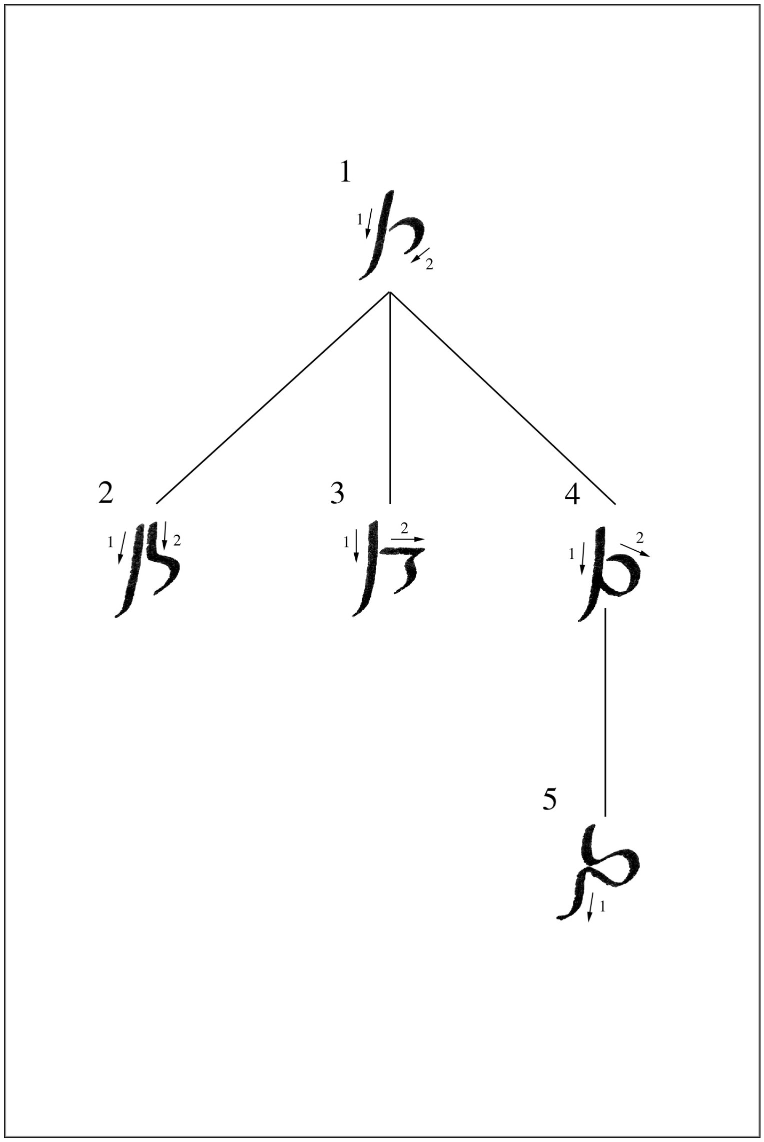
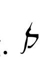


Figure 3 – Construction outlines of the five types of *pa*

in most manuscripts and inscriptions. The second type is first seen in some of the manuscripts of the BL collection (scribes 2 and 4) and later in the Senior collection. In this case the hook is written with a downward stroke, almost parallel to the stem, which curves out to the right and then down to form the hook, e.g.  (Senior 13r 12-22). The third type differs only slightly from the first, in that the hook has an angular shape, e.g. 

(BL 20 frame 54v 3-16). This type is seen only in the writing of BL scribe 20. In the fourth type the right arm forms a closed loop, e.g. *pu* (KDhp 5a1 [5]). This type is seen in the KDhp and the Niya documents. The fifth type is found only in the work of one scribe from the Schøyen collection. Here the character has been reformed so that it can be written with a single stroke: the stroke begins at the top of the stem, descends halfway, then forms a loop in a clockwise direction out to the right, before finishing off the stem, e.g. (Schøyen 42a 3-11).

This character appears with the following foot marks:

type 0	(Mānsehrā RE XII 1-14)
type 1	(KDhp 106b6 [156])
type 3	(Gardner plate 30 no. 3)
type 5	(BL 20 frame 53r 5-17)
type 6	(BL 16 frame 34r 2-20)
type 9	(BL 9 frame 15r 18a1)

2.22 *pha*[28]

Aśokan	BL 1	BL 9	KDhp	Niya

References: Bühler 1895: 60; 1904: 28; Konow 1929: cxxiii; Salomon 2000: §5.5.2.21.

[28] The transcription *pḱa*, found in Boyer, Rapson, and Senart 1920–9 (307), refers to the character , and is now transcribed as *vha;* see §3.1.3 below.

This character is distinguished from the unaspirated form by the slight extension of the horizontal leftward past the stem. Two types are identified on the basis of the construction of the left arm. The first makes both arms with a single stroke crossing the stem from left to right, e.g. (Bühler 26-1). The second type adds the left arm with a separate stroke, e.g. (BL 9 frame 15r 15b2). Forms equivalent to the fourth and fifth types of *pa* (see above) are also found with *pha*, i.e. the angular type (BL 20 frame 54v A1-8) and the closed loop type (Rapson 103).

This character appears with the following foot marks:

type 0	(BL 7 frame 13r 3-8)
type 1	(Rapson 103)
type 7	(KDhp 114d6 [164])
type 9	(BL 9 frame 15r 18a1)

2.23 *ba*

Aśokan	BL 1	BL 9	BL 21	KDhp	Niya	Schøyen 2

References: Bühler 1895: 53; Konow 1929: cxxiii; Salomon 2000: §5.5.2.22.

There are three types of this character. The first is found in inscriptions and manuscripts from all periods of the Kharoṣṭhī script. It consists of an s-shape turned on its side, with the final downward stroke extended to form the stem, e.g. (BL 1 frame 24r 39-2). A

second type is seen in some hands from the BL collection, where the upward stroke is written as a straight diagonal, e.g. (BL 9 frame 15r 24b1) and *bo* (BL 17 frame 36v C2-2-8). This type is the result of cursivization and probably also an attempt to avoid a push stroke (see §I.5.0). The third type represents the culmination of this process. Here the diagonal has become a horizontal line, and the initial downward stroke has been extended in order to distinguish *ba* from *ra*, e.g. (Schøyen 115a 5-12). This type, is first seen in an inscription of the Kaniṣka era, e.g. (Fussman 1980b: 5 2-16).[29]

This character appears with the following foot marks:

type 0	(Bühler 27-1)
type 1	(BL 1 frame 24r 39-2)
type 7	(KDhp 113b3 [163])
type 9	(BL 9 frame 15r 24b1)
type 10	(BL 21 frame 52v 93-10)

2.24 *bha* (fig. 4)

Aśokan	BL 1	BL 9	BL 21	KDhp	Niya	Schøyen 1	Schøyen 2

References: Bühler 1895: 60; 1904: 28; Boyer, Rapson, and Senart 1920–9: 307; Konow 1929: cxxiii; Salomon 2000: §5.5.2.23; Allon forthcoming: §5.4.2.24.

[29] This letter was read by Fussman and all previous editors as *kha* (see Fussman 1980b: 46–8, 52–3). However, it should now be corrected to *ba* to give the correct reading *svayabalasa* ‘of one who is his own army.’ see Salomon forthcoming b.

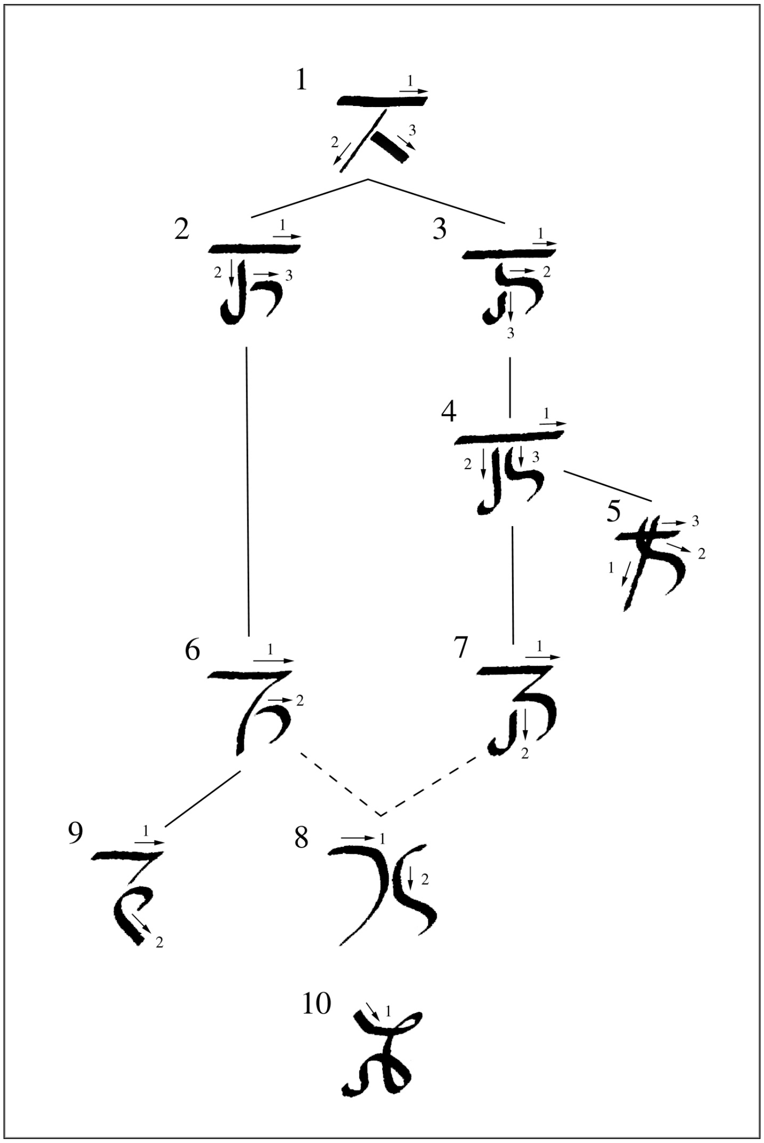


Figure 4 – Construction outlines of the ten types of *bha*

There are ten types of this character. The first, found in the Aśokan inscriptions, consists of a top line, an oblique stem sloping down to the left, and a short leg sloping down to the right from the midpoint of the stem, e.g. (Bühler 28-1). This type is found after the Aśokan period in one of the BL manuscripts, e.g. (BL 10 frame 15v 2-

37). This form probably represents a later simplification of the second type (see below) rather than a genuine archaism.

In the second type the stem is vertical and the right leg has become rounded, e.g.  (Konow plate 1 1-26). This type is well attested in inscriptions from the Indo-Greek period onwards. It is found in one of the British Library manuscripts, e.g.  (BL 4 frame 20r 28-18). Both Das Gupta (1958: table 1 29-3, 4, and 5) and Dani (1963: plate 23b) give examples of this type from the Aśokan period. Dani does not give references for the forms in his chart, and the three examples given by Das Gupta are miscopies and should be grouped with the first type. One form from the Aśokan inscription at Shāhbāzgaṛhī is almost a mirror image of the second type, *bho*  (Shāhbāzgaṛhī RE IV 10-34). This suggests a presumed prototype form * which developed into forms with a vertical stem and an arm on one side or the other. Such a form is illustrated in Dani in combination with the *u*-vowel diacritic, e.g. *bhu*  (23b-1), but I have not been able to verify this reading.

The third type is a reformation of the second type. It is made with three strokes: the top line is drawn first from left to right; the second stroke adds the top of the stem before turning rightward to make the hook; the last stroke adds the lower half of the stem, e.g.  (BL 1 frame 24r 25-6). Thus it is similar in formation to the second type of *ka*

(see §2.1 above). This type is found in several manuscripts of the BL collection (scribes 1, 6, 7, and 12).

The fourth type is a combination of the second and third types. It is formed with three strokes; first the top line; then the right arm, which consists of an s-shaped stroke starting from the mid-point of the top line; then the full stem is added from the top line, overlapping the top of the second stroke, e.g.  (BL 2 frame 2v 26-9). This type is written by BL scribes 2, 13, and 10.

The fifth type is similar to the fourth, but here the stem and right arm protrude above the top bar, indicating that they have been drawn first. It is possible that this was based on the third type of *pa* with the addition of a cross bar (see §2.21 above). This type has so far been found only in the Senior collection, e.g.  (Senior 20r 3-34).

The sixth type is written with two strokes. The top line has been combined with the stem by doubling back or with a narrow loop at the top right, the right arm being added secondarily, e.g. *bhi*  (BL 1 frame 24r 50-19). This type is found in some later inscriptions, e.g. Bīmarān, Sui Vihār, and the Wardak vase, as well as in scribes 1 and 10 of the BL manuscripts.

The seventh type, also written with two strokes, has so far only been observed in the work of BL scribe 1. Here the top line and right arm have been combined into a

single stroke, e.g. *bhi* (BL 1 frame 24r 52-5); compare the second type of *ka* (§2.1 above).

The eigth type, so-called ‘butterfly *bha*’, is written by BL scribes 20 and 21. Here the left side of the top line and stem have been combined as the first stroke, while the right side of the top line and the right arm are written with the second stroke, e.g. (BL 20 frame 53v 5-7).

The ninth type is found only in the Niya documents. It is written with two strokes, first the top line and a short vertical descending from the right side, then a rounded stroke drawn counter clockwise from the tip of the right hook, e.g. (Rapson 109), in some more cursive hands this type is easily confused with *tsa* (Rapson 192).

The last type is found only in scribe 2 of the Schøyen collection. It is written with a single stroke, e.g. *bhā* (Schøyen 42b 4-15); for details of its construction see fig. 4.

This character appears with the following foot marks:

type 0	(Bühler 28-1)
type 1	(BL 1 frame 24r 25-6)
type 6	(BL 21 frame 52r 73-18)
type 7	(KDhp 114b6 [164])
type 9	(BL 9 frame 15r 36a10)

2.25 *ma*

Aśokan	BL 1	BL 9	BL 21	KDhp	Niya	Schøyen 1	Schøyen 2
							

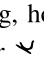
References: Bühler 1895: 56; 1904: 26, 28; Konow 1929: cxxiii; Salomon 2000: §5.5.2.24.

There are three types of this character. The first is the normal semicircular form, which is found in all periods of the Kharoṣṭhī script, e.g.  (BL 21 frame 51r 3-3). In some manuscripts the verticals tend to turn inwards, so that in extreme cases the form is almost a closed circle, e.g.  (BL 9 frame 15r 18a6).

In the second type the right stem extends higher than the left, e.g.  (BL 1 frame 24r 25-4). This variant is first seen in the work of some BL scribes (1, 4, 9, 12, 17, 19, 20) and also occurs among the Niya documents.

Another type of *ma* is found in the Aśokan inscriptions, it is distinguished by the small semicircle attached to the left vertical, e.g.  (Bühler 29-2).[30]

This character sometimes appears with a dot beneath it in the coin inscriptions of the Indo-Greek kings, e.g.  (Gardner plate 15 no. 1). Gardner read this as a long vowel marker in all cases, in spite of occurring in the word ***mā****hārajasa* [sic], (1886: 62).

[30] This character occurs in ***ma****ñati*, Shāhbāzgaṛhī RE XII, line 2 (Hultzsch 1927: 64). Bühler (1904: table 1) and Das Gupta (1958: table 1) accepted this reading, however, Dani (1963: plate 23b) read it as *maṃ*. Another variant of *ma* was identified in the character  (Bühler 29-3), Bühler (1904: table 1) and Das Gupta (1958: table 1) accepted this reading, however, Falk (1996: 154) rightly pointed out that it should be read as *maṃ* (see §4.1 below).

Bühler suggested a connection with type 2 footmark (1904: 27, see also §I.4.2). It remains to be seen if this is related to the similar form, (BL 20 frame 53r 22-7) found in one of the BL manuscripts. In the Wardak vase the syllable *mi* regularly occurs with a line beneath it, e.g. (Konow plate 33 1-60). Senart (1914: 574) transcribed it as *mi*, Konow (1929: 170) used *m(r)i*, while Brough (1962: 71) proposed the reading *mmi* (see below §3.3.13).

This character takes a number of specialized forms in combination with vowel diacritics. With *i*, in addition to the normal two stroke form, (BL 9 frame 15r 39b10), the diacritic may be written by turning the right vertical back through the middle of the character, e.g. (BL 9 frame 15r 18a4). Either of these forms may take a foot mark attached to the base of the *i*-vowel diacritic (see §1.2). Two forms of *me* are constructed on the same basis, e.g. (BL 1 frame 24r 38-9) and (BL 9 frame 15r 29b2). These two forms have been combined in on BL manuscript, e.g. *me* (BL 21 frame 52r 49-13).

The special ligature *mu* is first seen in the Bajaur casket inscription, e.g. (EI 24 3D-100). The older form is written with a horizontal stroke added to the left stem, e.g. (EI 24 3D-49). This type is found in the Aśokan inscriptions and other early records and is last seen in the Bajaur casket inscription (see §1.3).

2.25.1 *m̄a*[31]

BL 8


Reference: Salomon 2000: Appendix 4.

This form of *ma* with the superscript stroke has been found only once, in a small manuscript fragment from the BL collection, e.g.  (BL 8 frame 15r 2-8). It occurs three times, each corresponding to Skt. *hm*-, see Salomon 2000: 220.

2.26 *ya*

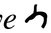
Aśokan	BL 1	BL 9	BL 21	KDhp	Niya	Schøyen 1	Schøyen 2
							

References: Bühler 1895: 55; 1904: 28; Boyer, Rapson, and Senart 1920–9: 308; Konow 1929: cxxiii; Brough 1962: 58–9; Salomon 1998a:55; Salomon 2000: §5.5.2.25.

There are four types of this character. The first type consists of an inverted v-shape, e.g.  (BL 1 frame 24r 32-4). This type is found from the time of the Aśokan inscriptions until the period of the BL manuscripts (scribes 1, 4, 5, 15, 17, 18, 19, and 20). It is written with two strokes, each starting from the mid-point.

The second type, found in one of the BL manuscript fragments (5B), is written with a single stroke. Here the form has been rotated clockwise slightly to accommodate the broad pen's resistance to upward strokes (see §I.5.0), e.g.  (BL 9 frame 15r 28a6).

[31] The character  transcribed as *m̄a* in Boyer, Rapson, and Senart 1920–9, is now written *rma*, see §3.2.2.

The third type is similar to the first, but the point has become rounded, e.g.  (Konow plate 12.1 4-19). This form is anticipated in *ye*  (Shāhbāzgaṛhī RE XII 7-43) in the Aśokan inscriptions. In the manuscripts this appears with a slant up to the right, e.g.  (Schøyen 44v A1-12), This slant is sometimes the only distinction between *ya* and *śa*; compare *śa*  (Schøyen 44r A2-4).

In the fourth type, the top of the letter is flat, e.g.  (Rapson 121) so that the *ya* and *śa* may be nearly identical, e.g. *ya*  (Senior 20r 13-8) and *śa*  (Senior 20r 11-1), (see Boyer, Rapson, and Senart 1920–9: 308).

This character appears with the following foot marks:

type 0	 (Bühler 30-1)
type 1	 (BL 20 frame 54r 28-6)
type 5	 (BL 21 frame 51r 15-16)
type 6	*yi*  (EI 24 3D-35)[32]
type 7	 (BL 3 frame 7r 3-5)

2.27 *ra*

Aśokan	BL 1	BL 9	BL 21	KDhp	Niya	Schøyen 1	Schøyen 2
							

[32] This form of *y-* is found only in the Bajaur casket inscription. It was transcribed as *yi* by Majumdar (1937) but as *ýi* by Fussman, who remarks "il n'est pas sûr que la marque diacritique figurant au bas d'un *y* et transcrite *ý* exprime un fait de prononciation [compare *ǵ*, *ȷ́*, *t́*, and *d́* above] : il peut s'agir d'une fioriture" (1983: 99).

References: Bühler 1895: 59 (18); Boyer, Rapson, and Senart 1920–9: 308; Konow 1929: cxxiv; Salomon 2000: §5.5.2.26.

The form of this character is fairly consistent throughout the Kharoṣṭhī period. Slight variations are found between the different scribes. The head may be short and straight as in the Aśokan inscriptions, e.g. (Bühler 31-1), hooked as in some of the later manuscripts, e.g. (BL 9 frame 15r 39a9); or closed to form a small loop, e.g. (BL 7 frame 13r 22-19). The horizontal may be relatively long, e.g. (BL 9 frame 15r 37a7), or short, e.g. (BL 21 frame 51r 3-23). The right shoulder may be pointed, e.g. (BL 20 frame 54r 14-7); square, e.g. (BL 1 frame 24r 39-9); or rounded, e.g. (BL 9 frame 15r 35a1). In the handwriting of scribe 2 of the Schøyen collection, this character is little more than a wavy line, e.g. (42b 1-8).

This character appears with the following foot marks:

type 0	(Bühler 31-1)
type 1	(BL 9 frame 15r 39b3)
type 5	(BL 21 frame 51r 3-23)
type 9	(BL 9 frame 15r 39a9)

2.28 *la*

Aśokan	BL 1	BL 9	BL 21	KDhp	Niya	Schøyen 1	Schøyen 2

References: Bühler 1895: 56; 1904: 26, 28; Konow 1929: cxxiv; Salomon 2000: §5.5.2.27.

There are two types of this character. The first is written with two strokes, first the left arm, then the stem, e.g. (BL 21 frame 52r 57-15). This type is found in inscriptions of all periods, as well as some of the manuscripts of the BL collection (scribes 1, 6, 10, 16, 20, and 21) and the Niya documents. The second type is written with a single stroke beginning from the tip of the left arm, up to the top of the stem, then doubling back to form the vertical, e.g. (Schøyen 44r A1-17). This type is found in the BL collection (scribes 1, 2, 4, 7, 9, 12, 14, 15, 18, and 19), the Senior manuscripts, the KDhp, and the Schøyen collection. The height of the stem above the left arm varies from the very short, e.g. (Bühler 32-1) to almost half the entire height of the character, e.g. (BL 10 frame 15r 3-26). The shorter stem is associated with the single-stroke type, the longer with the two stroke type.

This character appears with the following foot marks:

type 0	(Bühler 32-1)
type 1	(BL 10 frame 15r 3-26)
type 5	(BL 9 frame 15r 38b3)
type 6	(BL 18 frame 38v A2-3)
type 8	(BL 18 frame 39r E2-9)
type 9	(BL 9 frame 15r 26a3)

2.29 *va*

Aśokan	BL 1	BL 9	BL 21	KDhp	Niya	Schøyen 1	Schøyen 2
							

References: Bühler 1895: 54; 1904: 28; Boyer, Rapson, and Senart 1920–9: 308; Konow 1929: cxxiv; Salomon 2000: §5.5.2.28.

The form of this character is largely consistent throughout the Kharoṣṭhī period. Slight variations are found in the different records. The head and stem may be straight, e.g.  (Bühler 33-1) and  (BL 1 frame 25r 2-9), or rounded, e.g.  (BL 20 frame 54r B3-9) and  (BL 21 frame 51r 3-5). In the Senior manuscripts the right shoulder is pointed, e.g.  (13r 8-4). In the Niya documents the horizontal stroke is very short, e.g.  (Rapson 135). In the handwriting of Schøyen scribe 2 the stem takes the bulb-shape also seen with the independent vowels, e.g.  (42b 1-19).

When *va* is written with a short head, it is sometimes difficult to distinguish it from the independent vowel *a*, e.g. *va*  (BL 9 frame 15r 4a6) and *a*  (BL 9 frame 15r 36b1).

This character appears with the following foot marks:

type 0	 (Bühler 33-1)
type 1	 (Schøyen 44r C2-14)
type 5	 (BL 9 frame 15r 4a6)

2.29.1 *v́a*

Niya


Reference: Boyer, Rapson, and Senart 1920–9:309; Burrow 1937: 11.

This form of *va* with the rightward projection from the base of the character, has so far only been found in the Niya documents, e.g.  (Rapson 141). This letter was probably pronounced *w*, since it is found in the name V́ima Kadphises, which occurs in Greek transliterations as ΟΟΗΜΟ ΚΑΔΦΙCΗC (Whitehead 1914:183). However its use was not consistent as it often alternates with *v* in native proper names, e.g. Varpeya and V́arpeya, (see Burrow 1937: 11).

2.30 *śa*

Aśokan	BL 1	BL 9	BL 21	KDhp	Niya	Schøyen 1	Schøyen 2
							

References: Bühler 1895: 55; 1904: 26, 28; Konow 1929: cxxiv; Brough 1962:58–9; Salomon 1998b: 144; 2000: §5.5.2.29.

There are four types of this character. In the first type, the flat head and right leg are made with the first stroke, the left leg with the second, e.g.  (Bühler 34-1). This type is found in all periods of the Kharoṣṭhī script.

The second type is similar to the first, but the top is rounded. This type is first seen in inscriptions from the Indo-Scythian period, e.g.  (Konow plate 10.2 22). It is

also found in some of the manuscripts of the BL collection (scribes 1, 3, 9, 12, 18, 20), and in the Senior and Schøyen collections, e.g. (BL 9 frame 15r 14b4).

The third type is distinguished by a horizontal superscript line, e.g. (BL 10 frame 15r 14-8). This type has so far been observed in two manuscripts of the BL collection (scribes 2 and 10) and in the one of the Kharoṣṭhī manuscript fragments in the Pelliot collection (Salomon 1998b: 140, 144). It has been transcribed as *ś̄a*, by analogy with the other letters found with the superscript line (*kṣa, ḡa, c̄a, j̄a, ñ̄a, m̄a, ṣ̄a,* and *s̄a*). However, unlike these other forms, the superscript line with *śa* is not thought to signify a different phoneme, but rather to distinguish *śa* from *ya* which can be almost identical (see §2.26 above).

The fourth type has so far been noticed only in Central Asian document 661, the tablet from Endere. It distinguished form the above types by the slight extension of the top line over the left leg, e.g. *śȧ* (Boyer, Rapson, and Senart 1920–9: plate 12 661 2-12). The superscript dot in this example indicates a modified *a* vowel (see §1.1.3), rather than being a variant of the superscript line of the preceeding type.

This character may take a foot mark on either leg:

type 0	(Bühler 34-1)
type 1	(Rapson 144)
type 5	(BL 9 frame 15r 20b9)

type 7	 (BL 9 frame 15r 14b4)
types 5 + 7	 (BL 9 frame 15r 37b5)

2.30.1 *s̱a*[1]

Bajaur Casket


References: Majumdar 1937: 7; Konow 1947: 52–58; Fussman 1983: 99 n. 68.

This modified form of *śa* is found only in the Bajaur casket inscription. It is distinguished by a rightward projection from the base of the right leg, e.g.  (EI 24 3D-61), compare *śa*  (EI 24 3D-3). According to Fussman it would have been pronounced [*ẕ*] (1983: 99 n. 68).

2.31 *ṣa* (fig. 5)

Aśokan	BL 1	BL 9	BL 21	KDhp	Niya	Schøyen 1	Schøyen 2
							

References: Bühler 1895: 59; Konow 1929: cxxiv; Salomon 2000: §5.5.2.30.

There are five types of this character. The first consists of a slightly rounded head with a stem descending from its midpoint, e.g.  (Bühler 35-1). This type is regularly found in inscriptions from the Aśokan period onwards, and also in the Niya documents.

[1] In combination with the sibilants the same syllabic modifier which is noted elsewhere in transcription with an acute accent (*ǵ, ј́, t́* etc.) is noted with an under bar in order to avoid confusion with *ś*. (Fussman 1983: 99 n. 68). Majumdar transcribes this character as s*(r)a* (1937: 7).

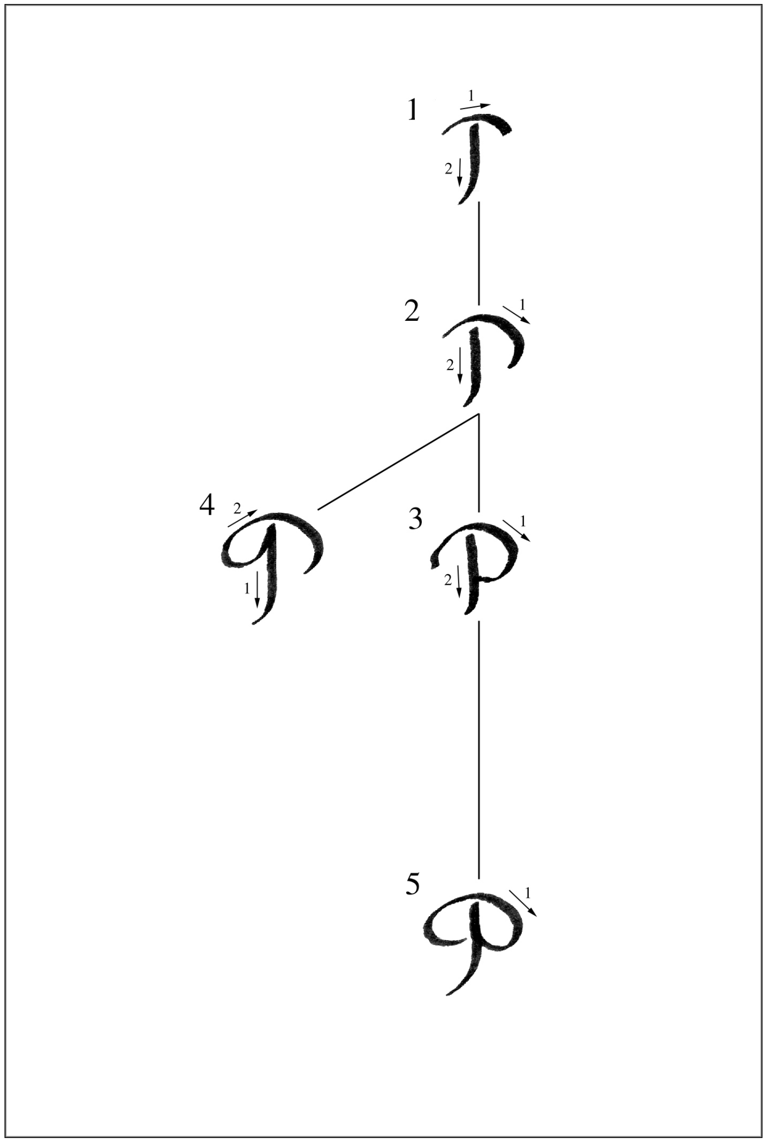


Figure 5 – Construction outlines of the five types of *ṣa*

The second type is distinguished from the first only by the greater curve of the head stroke, e.g.  (BL 1 frame 28r 68-12). This type, first seen in the Bajaur casket inscription,  (EI 24 3D-52), occurs sporadically in inscriptions (e.g. Yākubi, Pālāṭū

Ḍherī) but frequently in the manuscripts (BL scribes: 1, 4, 6, 7, 9, 15, 16, 18, 19, 20, and 21; KDhp; and Schøyen 1).

In the third type, the right side of the curved head stroke touches the stem, e.g.  (BL 21 frame 52v 76-5). This type is first seen in the manuscripts of the BL collection (scribes 1, 2, 5, 7, 9, 12, 13, 14, and 21) and also occurs in the KDhp, and the Senior manuscripts. BL scribe 7 sometimes writes this with both the right and left ends of the head stroke touching the stem, e.g.  (frame 13v 3-20), as such it appears to be a precursor to the fifth type, see below.

In the fourth type, the left side of the head stroke begins at the top of the stem, e.g.  (BL 10 frame 15r 11-26). This type has so far only been noted in the work of BL scribe 10 and the KDhp.

The fifth type is found only in the work of Schøyen scribe 2. It is the only type of this character written with a single stroke—beginning at the left side of the head, the strokes forms the large loop of the head before meeting the top of the stem from the right, and desceding, e.g.  (Schøyen 61+a 4-5).

In the manuscripts of the Senior collection, *ṣa* can be almost identical to *ka*, e.g. *ka*  (Senior 20r 5-35) and *ṣa*  (Senior 20r 8-14).

This character appears with the following foot marks:

type 0	(Bühler 35-1)
type 1	(BL 1 frame 24r 32-12)
type 4	(BL 9 frame 15r 35a5)
type 5	*ṣe* (BL 9 frame 15r 25c9)
type 6	(BL 21 frame 52v 76-5)

2.31.1 *ṣ̄a*

BL 9	KDhp

References: Konow 1929: cxxiv; Brough 1962: 63; Salomon 2000: §5.5.2.31.

The form of *ṣa* with superscript stroke is found in some inscriptions and manuscripts in places corresponding to Skt. *ṣṇ-*. Elsewhere this syllable is represented simply as *ṣa*. In what is possibly the earliest example of this character, the undated Kanhiāra inscription, the superscript stroke is a dot, e.g. (Konow 36.3 1-2, cf. *j̄a* §2.8.1).[2] In the BL manuscripts and all other examples of this character, the superscript stroke is a horizontal line, e.g. (BL 9 frame 15r 35b2). It is interesting that both of these examples seem to have the type 9 foot mark.

This character appears with the following foot marks:

type 0	(KDhp 84a3 [136])

[2] Konow (1929: 179) suggests that this inscription may be roughly contemporaneous with the Taxila copperplate of the year 78 (ca. 6 B.C.). A similar form appears in the tablet from Endere, e.g. (Boyer, Rapson, and Senart 1920–9: plate 12 661 3-31). However, the dot here is the vowel diacritic *ȧ* and not the superscript stroke of *ṣ̄a*, see §1.1.3.

type 9	 (BL 9 frame 15r 35b2)

2.32 *sa* (fig. 6)

Aśokan	BL 1	BL 9	BL 21	Niya	Schøyen 1	Schøyen 2
						

References: Bühler 1895: 57; 1904: 26, 28; Boyer, Rapson, and Senart 1920–9: 311 n.1; Konow 1929: cxxiv; Majumdar 1933: 171–2; Das Gupta 1950: 75–87; Brough 1962: 67–70; Salomon 1998: 55; 1999: 115; 2000: §5.5.2.32.

This character has been has long been regarded as the most reliable test letter for dating Kharoṣṭhī records paleographically, since it has four distinct types corresponding to different periods of the script.

The first, 'closed' type consists of a p-shape with an additional horn at the top of the stem, e.g.  (Bühler 36-1). This is the only type found in the Aśokan inscriptions but its use overlaps with both the later types during the Indo-Greek, Saka, and Indo-Parthian periods. No examples of this type have been found in the manuscripts. This letter was probably formed in two ways. The first with two strokes, the head and outer side of the loop, then the stem, e.g.  (Konow plate 1.1 25), and the second with a single stroke, starting with the top, forming the right side of the head before turning back towards the

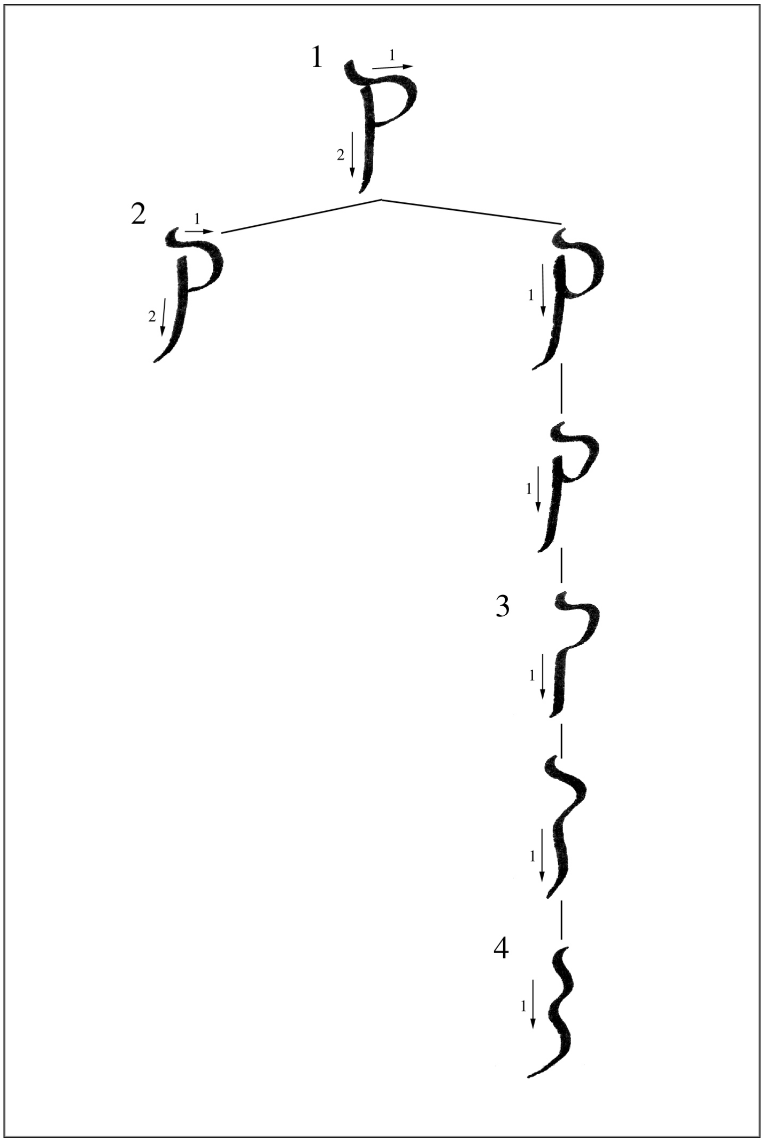


Figure 6 – Typological development of *sa*

top of the stem and then descending, e.g. *.[3] This latter formation is likely to have given rise to the second type.

[3] Specimens of such a formation are given in Das Gupta 1958: Table I-37-6, 8. However the forms found in the published photographs do not clearly demonstrate this construction.

The second, or intermediate type differs from the first in that the stem stroke does not completely close the head, e.g. (Konow plate 11.2 2-7). This type is first seen in the Taxila Meridarkh plate of the Indo-Greek period, but does not regularly occur in inscriptions until the Saka period. This type is also formed in two ways, either with two strokes, first the curved head and then the stem, e.g. (Konow plate 1.2 6), or with a single stroke, in which the stem is joined to the head stroke by doubling back at the top of the stem, e.g. (BL 7 frame 13v 5-6). This type is found in some of the manuscripts of the BL collection (scribes 2, 7, and 9).

In the third type the stem descends directly from the lower stroke of the head, e.g. (BL 9 frame 15r 29a1). This type is first seen in a coin legend of the Audumbaras (ca. 2nd–1st centuries B.C., Allan 1936: lxxxiii and 122), e.g. (Allan plate 15 no. 1). It occurs regularly in inscriptions and manuscripts from the time of the BL manuscripts onwards.

The fourth type is a further cursivized form in which the stroke for the "head and leg is only one wavy line" (Konow 1929: cxxiv), e.g. (Senior 13r 3-47). This type is characteristic of the period of the post-Kaniṣka Kuṣāṇa kings, but is found in a few of the BL manuscripts (scribes 19 and 20), e.g. (BL 14 frame 27v 30-25).

This character appears with the following foot marks:

type 0	(Bühler 36-1)

type 1	(BL 8 frame 15r 3-8)
type 3	(Gardner plate 6 no. 3)
type 5	(BL 9 frame 15r 29a1)
type 6	(Bailey 1982 plate 5 1-26)[4]

2.32.1 *s̱a*[5]

BL 9	BL 21	KDhp	Niya

References: Boyer, Rapson, and Senart 1920–9:310, 311n.1; Konow 1929: 165–70; Burrow 1937: 8; Brough 1962: 67–70; Hitch 1984: 192–5; Fussman 1993: 99–101; Salomon 1999: 121; 2000: §5.5.2.33, §5.9.2.

This character is the most common of the forms modified by the rightward projection (or cauda). This form first appears in the Bajaur casket inscription, e.g. (EI 24 2B-6). In the BL manuscripts (scribes 7, 9, 10, 12, 15, 16, 18, 19, 20, and 21), it appears variously as: a large hook to the right at the base of the letter, e.g. (BL 10 frame 15r 3-8), a short horizontal projection, e.g. (BL 9 frame 15r 28a7), or a long flat stroke, e.g. (BL 18 frame 39r D2-21). Some scribes write the head of this character as a narrow wavy line, e.g. (BL 7 frame 13v 6-10), rather than with the full head of *sa*, e.g. (BL 7 frame 13v 5-6). This character also occurs in the Wardak vase inscription (year 51 of the Kaniṣka era), the KDhp, the Senior scrolls and the Niya documents.

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[4] This character is the work of two engravers, only the first writes the foot mark, see Falk 1998a: 88.

[5] On the use of this transcription see n. 27 above. This letter has been transcribed by Konow as *s(r)a* (1929: 170), and by Dani as *s'a* (1963: 259). Majumdar does not indicate this mark in combination with *sa* although he has transliterated with other consonants as *-(r)-* (1937: 7).

The origin and phonetic value of this form has long been debated (see Brough 1962: 67–70). Senart (1914: 570–2) proposed that it represented the ligature *sya* (see §3.2.1 below) as a learned spelling for the OIA genitive singular. However, the earlier use of the cauda with other letters, particularly *ǵ* and *d́* in the Theodoros casket inscription (see §2.3.1 and §2.18.1), suggests that this stroke was transferred to *s̱a* either as a phonetic modifier or a graphic variant.

In the Bajaur casket it appears in place of the genitive singular *–s(s)a* < OIA *–sya* in *vijayamitras̱*a, but not in the following *rajasa*. In the Niya documents -*s̱a* regularly alternates with -*sya* in this position but never -*sa* (teste Rapson). Elsewhere in the Niya documents *s̱a* alternates with *sa*, e.g. *s̱arvapiṃḍa* (document 590) and *sarvapiṃḍa* (601); *mas̱asya* (599) and *masasya* (663). According to most authorities (Konow 1929: 166; Burrow 1937: 8; Fussman 1993: 99 n. 68), this character had the value [*za*].

In some documents (e.g. the Khvs-G) *s̱a* regularly appears in place of original intervocalic *–th-* and -*dh-* indicating that this letter came to represent the voiced fricative [ð] (Salomon 1999: 121).[6] BL scribe 1 always writes the normal *sa* in such contexts.

Some BL scribes do not write *s̱a* at all (e.g. scribe 1), while others write it in places where it is not etymologically justified, e.g. *uvas̱akramita* for Skt. *upasaṃkramya* (scribe 7). In the KDhp the modified form is found in the syllables *s̱a, s̱i,* and *s̱e,* whereas

[6] The same phenomenon also occurs in a few examples in the Niya documents, see Burrow 1937: 21.

the normal form is used for *so, su,*[7] *sr̥,* and *saṃ*. In the Senior collection, *sa* and *s̱a* appear to be used interchangeably, e.g. *s̱o bramaṇo* (Senior 20r 9) and *so bhamaṇa* (20r 11). All of these examples suggest that in at least some Gāndhārī dialects the difference between the two forms had become leveled.

2.32.2 *s̄a*

BL 9	BL 14	Schøyen 1	Niya
*	*s̄e*		*s̄ā*

Reference: Boyer, Rapson, and Senart 1920–9: 320–1; Salomon 2000: 5.5.2.34; Salomon and Allon forthcoming: 38–40, 57.

This form of *sa,* with superscript line, is first seen in a couple of manuscripts in the BL collection (scribes 9 and 14), e.g. *s̄e* (BL 14 frame 27v 33-15). It is also found in one of the Schøyen fragments, e.g. (44a 1-34) and Niya document 511, e.g. *s̄ā* (Boyer, Rapson, and Senart 1920–9: plate 8: 4-4). It occurs in syllables corresponding to OIA *sn*-, e.g. *s̄eha* = Skt. *sneha* (Salomon 2000: §5.9.5).

[7] Although the combination *s̱u* could, theoretically, be formed with the *u* vowel written as a separate stroke, * (see remarks on *hu* etc. §1.3 above), I do not know of a single instance where this occurs.

2.33 *za*

BL 2	Niya
	

References: Bühler 1895: 60; Boyer, Rapson, and Senart 1920–9: 303; Konow 1929: cxxii; Burrow 1937: 8–9; Brough: 60–2; Dani 1963: 262.

This character is generally used to render a foreign *z*, but also appears in intervocalic position corresponding to Skt. *s* or *dh*. There is only one possible case in which it corresponds to MIA *jha* or Skt. *dhya*, that is in the word *zaṇa* = Skt. *dhyāna* in the Senavarma inscription,  (Bailey 1980 plate 1 5-4). The same letter occurs in line 8 of the same inscription in the name of Senavarma's mother Uzaṃda, thus there can be no doubt that the reading is correct. One possible explanation for this situation may be that the pronunciation of the two sounds (*za* and *jha*) had merged. In support of this hypothesis we should note that some of the modern Kafiri and Dardic languages show similar development from OIA *dhy*-: Pashai *waraz* < Skt. **uparādhyati*; Woṭapūrī *parz-*, Gawar-Bati *parū́z* < Skt. *paribudhyate; Gawar-Bati *plēwuz-* < Skt. prabudhyate; Kuṛaṅgali *buz-* < Skt. *budhyate*; Ashkun *mäz,* Tirāhī *manz,* Shumashti *mā̃z-ge,* Gawar-Bati *manz,* Maiyā̃ *maz* < Skt. *madhya*-; Ashkun *mẵzuma*, Tirāhī *manzum*, Shumashti *mā̃́zimə* < Skt. *madhyama-*; Kuṛaṅgali *saraz-*, Waigalī *saraz-* < Skt. **saṃrādhyati* (Turner 1962). While, admittedly, none of these examples show the behavior of *dhy-* in initial position, never-the-less they do prove the existence of a sound change from *dhy-* >

z- in some of the dialects and languages of this area. I have therefore followed Lüders (1936), Burrow (1937), and Brough (1962) in transcribing this character as *za*.

Although this character (written as *jha*) appears in Hultzsch's edition of the Aśokan inscriptions, both Brough and Dani assert that all cases of *jha* there should be read as *ja* (see Brough 1962: 59 and Dani 1963: 262). Consequently the form given in Bühler's table,  (Bühler 13-1) should be read as *ja* and the short downward stroke from the midpoint of the letter should be disregarded. The first genuine occurrences of this letter are therefore in the Takht-i-Bāhī inscription of the year 103, e.g. *rzu*  (Konow 12.1 5-2) and Fragment 1 of the BL manuscripts, e.g.  (BL 2 frame 2v 21-7). This character has not yet been found in any other manuscripts, but does occur sporadically in inscriptions until the Niya documents, e.g.  (Rapson 50).[8]

The form of this letter is consistent in all periods of the script. It is made with two strokes, first the left arm with the angular corner, then the stem. If the reading *ze* in the Āra inscription is correct (, Konow 32-1-2-2), the absence of the horizontal stroke is likely to be an economy of the engraving technique rather than a genuine variant.

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[8] Boyer, Rapson, and Senart have transcribed both (*za*) and  (*ju*) as *jha* and *jhu* respectively. However, the second example is in fact the one-stroke form of *ja* see §2.9 above.

This character appears with the following foot marks:

type 0	 (BL 2 frame 2v 21-7)
type 1	 (Rapson 50)
type 3	 (Boyer, Rapson, and Senart 1920–9: plate 12 661 1-11)

2.34 *ha*

Aśokan	BL 1	BL 9	BL 21	KDhp	Niya	Schøyen 1	Schøyen 2
							

References: Bühler 1895: 54; 1904: 26; Konow 1929: cxxiv; Salomon 2000: §5.5.2.35.

There are two types of *ha*. The first is the normal form found in inscriptions and manuscripts in all periods of the Kharoṣṭhī script. It consists of a single stroke which is the mirror image of the Roman letter s, e.g.  (Bühler 37-1).

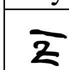
A number of slight variants appear in the manuscripts, based on this type. The first of these, found only in the handwriting of BL scribe 6, has a spiral head, e.g.  (BL 6 frame 8v F1-19). The second variant has a closed head, e.g.  (BL 10 frame 15r 3-11). This is seen in the work of BL scribe 10 and Schøyen scribe 2. In two BL scribes (1, 9) and the KDhp, the foot of *ha* is sometimes quite minimal, e.g.  (BL 9 frame 25a10). Several of the BL scribes (2, 6, 7, 16, 17, 19, and 21) and both of the Schøyen scribes studied so far write *ha* with a flat or straight foot, e.g.  (Schøyen 44r B1-7). In the

Aśokan inscriptions and the Senior manuscripts, the foot sometimes slants down to the right, e.g. (Bühler 37-2) and (Senior 8r 4-16). In the Niya documents the foot turns only slightly downwards, e.g. (Rapson 163).

The second type of *ha* is similar to the first type only it has been turned through 90°, e.g. (Gardner plate 14 no. 5). This type is found only in coin legends from the time of the Indo-Greek kings until the Indo-Parthian period. A variant of this type, with a dot beneath, is found in some of the Indo-Greek coins, e.g. (Gardner plate 15 no. 1).[9] Bühler suggested that this variant is may be connected with the type 2 foot mark (1904: 27, see also §I.4.2).

As the base of this letter turns to the right, it cannot be combined with the *u*-vowel diacritic in the usual way, thus various specialized forms of *hu* developed (see §1.3 above). Similarly this character does not appear with a foot mark.

2.34.1 *h̄a*

Niya


[9] This form was transcribed as *hā* by Gardner 1886: 62, (see §2.25) but was read by Whitehead (1914: 30, plate 3 no. 150) as simply *ha*.

This character has so far been observed only once in one of the Niya documents (no. 320). It appears in the form *h̄*- corresponding to OIA *hṇ*-, e.g. *gr̥h̄eyāti* = Skt. *gr̥hṇīyāt* (Boyer, Rapson, and Senart 1920–9: 321).

3.0 Conjunct Characters

Because the consonantal characters of the Kharoṣṭhī script include the inherent vowel *a*, the script had to develop special means of expressing consonant clusters. The solutions to this problem are found in the three basic kinds of conjunct consonants.

The first class of conjuncts are specialized ligatures which bear no graphic resemblance to their presumed component parts. Such ligatures are found from the beginning of the Kharoṣṭhī period, particularly common are *kṣa* and *sta*. Each of the ligatured forms will be discussed in full below (§3.1 ff.).

In the second class, diacritic strokes (systemically comparable to the vowel markers), indicate the presence of one of the semivowels, e.g. *rtha* from preconsonantal *r* + *tha*. These forms will be discussed under each of the different strokes (§3.2).

The third class of conjuncts are formed by combining the complete forms of characters into a single graphic unit, e.g. *ṣta* from *ṣa* + *ta*. For the sake of brevity,

all such forms will be presented but only those of special interest will be discussed in detail (§3.3).

In addition to the above classes of conjunct consonants, some OIA conjuncts are represented in Kharoṣṭhī script with a superscript horizontal line. Since the pronunciation of these forms is, in most cases, likely to be modified only by additional aspiration, rather than being true conjunct consonants, they have been treated above under the individual letters concerned (see also §4.3).

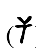
3.1 Ligatures

3.1.1 *kṣa*[42]

Aśokan	BL 1	BL 9	BL 21	KDhp	Niya	Schøyen 1	Schøyen 2
							

References: Boyer, Rapson, and Senart 1920–9: 302; Konow 1929: cxxi; Bailey 1946: 770–5; Brough 1962: 72–3; Salomon 2000: §5.5.4.1.

There are three types of this character. The first is written with two strokes, a semicircle open to the top, and then a stem descending from its midpoint, e.g.  (Rapson 38). This type is seen in documents from all periods of the script. The second type is a single-stroke form in which the stem descends from the right arm, e.g. *kṣi*  (BL 21 frame 51v 115-9). This type is seen only rarely in some manuscript hands. The general

[42] This character was originally identified as a modified form of *cha* () owing to the graphic similarity of the two letters. Consequently it has been transcribed in various different ways expressing this connection, e.g. *ccha* in Gardner (1886); *cha* in Bühler (1904); *ch'a* in Boyer, Rapson, and Senart 1920–9 and Das Gupta (1958); *cch'a* in Dani (1963). Hultzsch (1925), Konow (1929), Bailey (1946) and most modern editors use the transcription *kṣa*, see Brough 1962: 72–3.

avoidance of this variety is perhaps due to the risk of confusion with cursive forms of *ja* and *ḍa* (e.g. Fussman 1980: 52; see §2.8 and §2.13 above).

The third type, found only in the Niya documents, is distinguished by the addition of a horizontal line above the character, e.g.  (Rapson 39). Although this mark normally indicates a modified form of the radical (see §4.2), it appears so frequently in the Niya style that it seems to have become an integral part of this letter, "Indeed so constantly is this character written as *c̄h́a* [i.e. *kṣ̄a*] . . . that the few examples in which the line does not appear in our printed text may well be questioned" (Boyer, Rapson, and Senart 1920–9: 302). Brough has suggested a connection with the compound *khkṣa* () found in the KDhp: "It is probable that with this character the superscript stroke . . . represents the earlier superscript *kh*, either as a simple diacritic replacing it, or just conceivably, as a cursive development" (1962: 73). However, the superscript stroke is found with other characters before the time of the KDhp (see §2.8.1), making this explanation unlikely.

This character appears with the following foot marks:

type 0	 (Bühler 11-2)
type 1	 (BL 9 frame 15r 23a2)
type 4	 (BL 1 frame 24r 39-1)
type 8	 (BL 21 frame 52v 81-10)

3.1.2 *mra*

BL 9	KDhp
	*mru* 

References: Brough 1962: 71–2; Salomon 2000: §5.5.4.5.

This character is distinguished from *ma* by the extension of the right upward stroke into a large hook, e.g.  (BL 9 frame 15r 33b10). A similar form occurs in the KDhp in *mru*  (133d4 [184]). In this case the right arm has been lengthened but not rounded into a hook. This type was read by Bailey (1945: p.491 A7d6) as a variant of *mu* (, see §2.25), however in the light of new evidence from the Khvs-G (see Salomon 2000: §5.5.4.5), Brough's proposed reading of *mru* (1962: 71–2) is now seen to be correct.

This form may have evolved by exaggerating the normal horizontal stroke of the postconsonantal *r* diacritic with *ma*. It occurs four times in the Aśokan inscriptions, e.g. *mri*  (Mānsehrā RE I 5-9).[43] In the Schøyen manuscripts the combination *mri* is written with the normal postconsonantal *r* marker attached to the base of the *i*-vowel diacritic, e.g.  (Schøyen 115b 2-4).

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[43] Compare also the normal treatment of postconsonantal *r* in §3.2.3 below.

3.1.3 *vha*[44]

Coins	BL 10	KDhp	Niya
	*vhi* 		

References: Lüders 1909: 654–7; Boyer, Rapson, and Senart 1920–9: 307; Brough 1962: 65–7.

This character first appears in the coin inscriptions of Gondophernes, where it appears as a swastika without the lower left limb, e.g.  (Gardner plate 22 no. 12). In BL Fragment 5C the right arm is extended and the foot does not bend to the right, e.g. *vhi*  (BL 10 frame 15r 2-34). In the KDhp a similar form is found but with a much greater extension of the right arm, e.g.  (120a8 [171]). In the Niya documents the head stroke is very short and the right arm has a slight hook, e.g.  (Rapson 104), as such it is very similar to *ña*  (Rapson 53).

Lüders first proposed the transcription *vha* (1909: 654 ff.) which has won general acceptance, though Brough warns that we should not therefore be committed "to describing the sound as an 'aspirated *v*'" (1962: 66), as -*vh*- sometimes occurs in place of -*v*- when there is no adjacent aspirate.

[44] This character has been transcribed in various ways: Bühler used the transcription *pha* (1904: table 1 26-10); Senart used *bha* (1898: 205–6); Franke proposed the value *fa* (1902: 111–2); Boyer, Rapson, and Senart used *pĥa* (1920–9: 307).

3.1.4 *sta*

Aśokan	BL 1	BL 9	BL 21	KDhp	Niya	Schøyen 2
		*staṃ* 	*sti* 			

References: Konow 1929: cxxv; Brough 1962: 75–7; Salomon 2000: §5.5.4.7.

There are two types of this character. The first consists of a leftward horizontal at the top of the stem, with a second horizontal stroke across the middle, e.g.  (BL 1 frame 24r 17-5). This is the normal type found throughout the Kharoṣṭhī period. In the second type the cross bar has a vertical extension on the right side, e.g.  (Schøyen 61a B2-3). This type has so far been observed only in the work of Schøyen scribe 2.

This character appears with the following foot marks:

type 0	 (Rapson 239)
type 4	 (Bühler 39-3)

3.2 Diacritic conjuncts

3.2.1 Postconsonantal *y*

There are four types of the postconsonantal *y* marker. The first, found in the combination *mya* in the Aśokan inscription at Mānsehrā, consists of the normal *y* sign written beneath *ma*, e.g.  (Mānsehrā RE IX 4-37). This type has not been noted in any of the later documents.

The second type consists of a wavy line attached to the base of the radical, e.g. *bhye* (Mānsehrā RE IV 23-5). This type is found in inscriptions from the Aśokan period until the time of the Wardak vase (year 51 of the Kaniṣka era). In all of the post-Aśokan examples the end of the *y*-stroke turns to the right in a short horizontal, e.g. *lya* (Konow plate 33 1-29). Senart suggested that this feature may be associated with the origin of the special sibilant *s̱a* (1914: 570–2; see also §2.32.1).

The third type consists of a double hook drawn to the left at the base of the radical, e.g. (Rapson 197). This type, first seen in an embryonic form in one of the BL manuscripts, e.g. *psya* (BL 21 frame 52r 46-22), is the normal form in the Niya documents.

The fourth type is similar to the last but is written as a separate stroke beneath the radical, e.g. *tya* (Schøyen 61+a 3-1). This type is found in the some of the Schøyen manuscripts and in the Niya documents in the syllable *mya* (Rapson 209).

In the combination *drya* the *y*-stroke is attached to the end of postconsonantal *r*-diacritic, whereas in *vhrya* it has been written at the base of the stem below the *r* stroke.

The following table shows the combinations that occur with postconsonantal *y*:

tya (Schøyen 61+a 3-1)	*tye* (Rapson 189)	*thya* (Konow plate 33 3-100)
drya (Rapson 195)	*dhya* (Rapson 197) (Schøyen 42a 4-8)	*pya* (Konow plate 33 3-52)
psya (BL 21 frame 52r 46-22)	*bhye* (Mānsehrā RE IV 23-5)	*mya* (Mānsehrā RE IX 4-37) (Rapson 209)
lya (Konow plate 33 1-29) (Schøyen 65v 1-3)	*vya* (Schøyen add.r 2-24)	*vhrya* (Konow plate 27.2 11)
ṣye (Schøyen 115b 3-11)	*sya* (Rapson 247)[45] (Schøyen add.r 2-9)	*hya* (Schøyen 115a 3-3)

3.2.2 Preconsonantal *r*

There are five types of the preconsonantal *r* sign. The first is found in inscriptions from the Aśokan period until the beginning of the first century A.D. It consists of a horizontal line drawn through the middle of the stem, e.g. *rva* (Mānsehrā RE V 25-10). This type may have a slight downward turn at the right, e.g. (Mānsehrā RE V 21-55),[46] and survives in later periods particularly in combination with *ma*, e.g. *rma* (Rapson

[45] The form transcribed as *s*^{y}*a* in Fussman 1985b (37) is rather a normal *sa* with the type 5 foot mark (see §I.4.5, §II.2.32).

[46] Hultzsch has read all occurrences of this sign as postconsonantal *r*, whereas Das Gupta (1958: 20) and Dani (1963: 264) have suggested that the these forms should be read as preconsonantal *r* and only the horizontal stroke affixed to the base of the radical should be read as postconsonantal *r*.

114),[47] and rarely with other letters, e.g. *rṣa* (KDhp 21b7 [21]). This combination sometimes appears with the type 3 footmark, e.g. *rma* (KDhp 0a4 [0]).

The second type is found in manuscripts and inscriptions form the period of the BL documents onwards. Here preconsonantal *r* sign is formed by joining the stem to the start of the horizontal line with a loop, creating a clockwise spiral. The extent of the spiral ranges from 360°, as in *rga* (BL 9 frame 15r 27d6), to 540° in *rtha* (Rapson 212). The end of the stroke may rejoin the base of the stem forming a bisected circle, e.g. *rji* (Schøyen 44v A1-29). This type is seen occasionally in combination with *ma*, in which case the spiral is made in a counter-clockwise direction form the top of the stem, (BL 1 frame 24r 48-2).

In the third type the loop on the left side has almost disappeared, so that the sign appears as a rounded hook to the right, e.g. (BL 21 frame 52v 90-8). This type is first seen in the BL manuscripts, and is also noted in the Niya documents.

The fourth type is an anomalous form found only in the Khvs-G (see Salomon 2000: §5.5.4.3). It is found twice in conjunction with the radical *dha* and consists of a loop drawn in a counterclockwise direction, looping around to touch the base of the stem, e.g. *rdha* (BL 9 frame 15r 25b2). It is conceivable that this type arose as a reformation

[47] This letter was transcribed in Boyer, Rapson, and Senart 1920–9 as *m̄a*, see §2.25.1.

of third type, compare for example the recently discovered stone inscription from Endere, *rdha* (Salomon forthcoming b A2-6), although this particular form is approximately 200 years younger than the Khvs-G example.

The fifth type is found in one of the Schøyen fragments. It consists of a ∞-shape written across the upper stem of *rmu,* e.g. (Schøyen 67a 2-3, see Salomon 1998b: 142).

Besides signifying preconsonantal *r,* this sign is also used occasionally to indicate a geminate consonant: "It is . . . possible that preconsonantal *r* came to have a secondary function of marking geminates" (Salomon 1999: 122, see also Salomon 2000: §5.9.4).

The following table shows the combinations that occur with preconsonantal *r*:

rkha (BL 1 frame 3r 57-4)	*rga* (BL 9 frame 15r 26d6)	*rce* (BL 1 frame 4r 86-2)
rja (BL 21 frame 52v 90-8)	*rṭa* (Shāhbāzgaṛhī RE VII 5-4)[48]	*rṇa* (KDhp 186b2 [82])
rta (Rapson 211)	*rtha* (Rapson 212)	*rda* (KDhp 111d7 [161])
rdha (KDhp 172c7 [222]) (BL 9 frame 15r 25b2)	*rna* (Schøyen add.r 1-17)	*rpa* (Schøyen 44r A3-3)

[48] This form was read by Hultzsch (1925: 59) as *rṭi*; see n. 39.

rbha (BL 1 frame 24r 17-4)	*rma* (BL 1 frame 24r 48-2) (KDhp 0a4 [0]) (Rapson 114)	*rmi* (BL 1 frame 2r 28-6)
rmu (Schøyen 67a 2-3)	*rya* (BL 9 frame 15r udd. 2a5) (Rapson 215)	*rva* (Mānsehrā RE V 25-10) (Mānsehrā RE V 21-55)[49] (BL 1 frame 24r 19-11)
rvaṃ (Schøyen 42a 2-6)	*rvra* (Rapson 216)	*rśa* (BL 1 frame 24r 48-7)
rṣa (BL 1 frame 5r 123-11) (KDhp 21b7 [21])	*rsu* (Rapson 218)	*rza* (Konow plate 26.2 2-10)

3.2.3 Postconsonantal *r*

With the exception of the ligature *mra* (see §3.1.2), postconsonantal *r* is marked in all periods of the Kharoṣṭhī script with a rightward stroke at the base of the character, e.g. *pra* (BL 1 frame 24r 39-4).[50]

This stroke varies between a short horizontal stroke as in *dhra* (BL 1 frame 25r 9-7), a long stroke in *sra* (Rapson 248), an extremely long stroke in *pra* (BL 18 frame 39r E3-29), and a slight upward hook in *bra* (BL 1 frame 24r 18-11). In *ghra*

[49] These Aśokan forms were both read by Hultzsch (1925: 75) as *vra*; see n. 39.

[50] The reading of the forms *kra* (Rapson 173), *pre* (Rapson 173), and *ṣra* (Rapson 286) in the Niya documents as postconsonantal *r,* are doubtful (Boyer, Rapson, and Senart 1920–9:317).

(BL 1 frame 24r 50-3), the stroke order has been rearranged so that the right arm of *gha* and the *r* sign have been written with a single curve in a counter clockwise direction. In *rvra* (Rapson 216), the postconsonantal *r* mark has been attached to the base of the preconsonantal *r*. In *vhrya* (Konow plate 27 11) the postconsontal *y* has been added to the stem beneath the *r,* whereas in (Rapson 197) it has been added to the outer tip of the *r* stroke.

The following table shows the combinations that occur with postconsonantal *r*.

kra (BL 1 frame 25r 3-14)	*gra* (KDhp 107b6 [157])	*ghra* (BL 1 frame 24r 50-3)
tra (BL 1 frame 24r 37-9)	*thra* (Bühler 21-4)	*dra* (BL 9 frame 15r 23a9)
drya (Rapson 197)	*dhra* (BL 1 frame 25r 9-7)	*pra* (BL 1 frame 24r 39-4)
bra (BL 1 frame 24r 18-11)	*bhra* (Bühler 28-5)	*rvra* (Rapson 216)
vra (KDhp 188b2 [77])	*vhri* (Konow plate 14 2-5)	*vhrya* (Konow plate 27 11)
śra (KDhp 16b5 [16])	*stra* (KDhp 192b3 [238])	*sra* (Rapson 248)

3.2.4 Postconsonantal *v*

Postconsonantal *v* is marked in all periods of the script with a hook up to the right from the base of the radical, e.g. *dva* (KDhp 12b4 [12]). The form varies in size from

a small hook, e.g. *ṣva* (Rapson 237), to a long vertical stroke, e.g. *dhva* (KDhp 132c4 [183]).

The following table shows the combinations that occur with postconsonantal *v*.

ktvā (Rapson 170)	*kva* (BL 1 frame 5r 103-6)	*khva* (Rapson 175)
cva (Rapson 184)	*ṭhva* (Schøyen 115b 3-2)	*tva* (BL 9 frame 15r 6a11)
dva (KDhp 12b4 [12])	*dhva* (KDhp 132c4 [183])	*lve* (Rapson 224)
śva (KDhp 238a5 [285])	*ṣva* (Rapson 237)	*ṣṭhva* (Schøyen 61+b 4-3)
sva (Schøyen 115b 4-5)		

3.2.5 Postconsonantal *ṕ/ẏ*[51]

References: Boyer, Rapson, and Senart 1920–9: 318–9; Burrow 1937: 11.

This character has been identified by the editors of the Niya documents in combination with the letters *l, ṣ,* and *s*. It consists of a loop written at the base of the character and crossing the stem slightly, e.g. *ṣṕa* (Rapson 238). Thus it is similar to

[51] In the case of *ṣṕa* and *sṕa* I have retained the reading *ṕ*. However, I have adopted the transcription *ẏ* for the subscript stroke of *lẏi*, rather than *y* (both of which are suggested by Burrow) in order to distinguish it from the normal postconsonantal *y* (§3.2.1). This form is not related to the transcription *ẏ* used by Fussman in the Bajaur Casket inscription; see n. 28 above.

the cursive type of the *i*-vowel diacritic, e.g. *ni* (see §1.2) and the preconsonantal *r* sign, e.g. *rza* (see §3.2.2).

Burrow has argued in favor of the transcription *ly*- or *lý*- on the basis of the three occurrences of this character in words with Sanskrit cognates (1937: 11).[52] However, he is silent with respect to the use of the same sign with *ṣ* and *s*, despite Rapson's hesitance to admit that "this curve can have had two entirely different uses, . . . since it undoubtedly denotes *ṽa* when joined to *s* and *ṣ*" (Boyer, Rapson, and Senart 1920–9: 319). As a result I have maintained the unhappy situation of using two different transcriptions for the same sign.

The following table shows the combinations that occur with postconsonantal *ṕ/ý*.

lýi (Rapson 221)	*ṣṕa* (Rapson 238)	*sṕa* (Rapson 244)

3.3 Combined characters

The following tables show attested forms of the combined-character conjunct consonants arranged according to their initials, see appendix A for a reverse index to these forms.

[52] *kalýanadharma* = Skt. *kalyāṇadharma; lṕihida* = G *lihida,* Skt. *likhita; vyalýi* = G *vyala,* Skt. *vyāla/ vyāḍa*.

3.3.1 *k*-

kta (Rapson 169) (Schøyen add.r 2-25)	*kma* (Rapson 171)	*k*^{i}*tsi* (Rapson 176)

The character *k*^{i}*tsi* is written four times in the name Rok^{i}tsi in Niya document 591. It is the only known example of a letter with two vowel diacritics, “the first, no doubt, representing the indistinct vowel heard in the pronunciation of the group *ktsi*.” (Boyer, Rapson, and Senart 1920–9: 313). Unfortunately this document has not been included among the published photographs.

3.3.2 *kh*-

khkṣa (KDhp 217f4 [263])	*khti* (Konow plate 16 26)	*khsa* (Konow plate 16 26)

In the character *khti* the letter *t* has been attached to the base of the *i*-vowel diacritic rather than the radical.

3.3.3 *g*-

gtsi (Rapson 177)	*ǵnu* (Rapson 179)

On the transcription *gga* in the KDhp see §2.3.4 above.

3.3.4 *ṅ*-

On the transcriptions *ṅka,* and *ṅǵa* in the Niya documents see §2.5 above.

3.3.5 *c-*

cma (Rapson 183)

3.3.6 *j-*

jña (Pelliot 1a-3-6)	*jña* (Schøyen 42b-4-13)

The Gāndhārī equivalent of OIA *jña* is normally represented in Kharoṣṭhī as *ña*. However, the Sanskritized spelling *jña* has been observed in both the Pelliot and Schøyen manuscript fragments. In the Pelliot collection the sign for *j-* is written at the top of the stem of *ña*, e.g. (Salomon 1998b: 1a 3-6), whereas in the Schøyen collection it is attached to the right arm, e.g. (Schøyen 42b 4-13). It occurs in Schøyen fragment 2, line A2, in the word *ajñatirthigehi* = Skt. *anyatīrthikaiḥ*, where we would have expected *aña-* rather than *ajña-*, suggesting that both forms were pronounced the same, (see Salomon 1998b: 128), i.e. this is a hyper-Sanskritization, or wrong Sanskritization.

3.3.7 *ñ-*

ñǵe (Rapson 187)

3.3.8 *ṭ*-

The transcription *ṭṭ* is found in the word *moti[ṭṭoṃ]* in Niya document 143, however, Rapson did not illustrate or refer to this form. The photographs of this document have not yet been published.

3.3.9 *ḍ*-

The transcription *ḍḍh* is found in the word *[maṃ]dhuḍḍhiḍhasa̱* in Niya document 75, however, Rapson did not illustrate or refer to this form. The photographs of this document have not yet been published.

3.3.10 *t*-

tǵa (Rapson 182)	*tta* (Schøyen 115a 4-10)	*tma* (Rapson 188)
tsa (BL 9 frame 5r 24c9)[53] (KDhp 113c2 [163])	*tsma* (Rapson 193)	

There are three types of the character *tsa*. The first is found in the Khvs-G, where the form appears in more or less as expected, *ta* + *sa* = (BL 9 frame 15r-24c9). In this case the lower portion appears to be based on the second type of *sa* with semi-open head (see §2.31 above). In the second type, found in the Pājā inscription of the year 111 (c. beginning of the common era), the stem closes the lower loop, e.g. (Konow plate

[53] This character has been interpreted and transcribed in several different ways in editions of Kharoṣṭhī documents: Senart transcribed it as *ṅsa*, Bühler, Franke, Lüders, Konow, and Bailey read *tśa*, while Rapson, Burrow, and Brough chose the transcription *tsa*; see Brough 1962: 73–4.

13.1 1-3). In the third type, found in all examples of this character from the Kuṣāṇa period onwards, the stem descends from the mid-point, e.g. (KDhp 113c2 [163]). As a result the character no longer resembles *ta* plus the original *sa*, but instead appears more like *ta* + *śa* which has led some authorities to adopt the transcription *tśa* (see n. 53).

3.3.11 *n-*

nga (Rapson 198)	*nǵe* (Rapson 199)

3.3.12 *p-*

pgu (Rapson 201)	*pǵe* (Rapson 202)	*pte* (Rapson 200)
psu (Boyer, Rapson, and Senart 1920–9: plate 9 571 covering tablet rev. 2-30)	*psya* (BL 21 frame 52r 46-22)	

3.3.13 *m-*

mǵe (Rapson 208)	*mma* (Shāhbāzgaṛhī RE IX 19-12) (KDhp 56a6 [106])[54]	*mṣo* (Rapson 210)

The character transcribed as *mma* in the KDhp, consists of the normal *ma* with a subscript stroke that is similar, if not identical to anusvāra (see §4.1 below). There are two anomalous forms of this character in the KDhp, *mma* (8a5 [8]) and *mmi* (49a2

[54] The character *ma* with the anusvāra was first read as *mm-* by Senart in *gammira* (1898: 235). see also Bailey 1945: 492 vs. 13; 1946: 787–9; and Brough 1962: 70–1. Leumann (1903) and Konow (1929: cxi) both read it as *mha*.

[99]). Brough explained the subscript in these examples as a cursive reduction of the subscript *ma* found elsewhere in the KDhp, and proposed reading *mmi* for Konow's *m(r)i* for the character (Konow plate 33 1-60) found in the Wardak vase inscription (Brough 1962: 71).

3.3.14 *l*-

lpa (Rapson 219)	*lpi* (Whitehead plate 17 no. 36)	*lme* (Rapson 222) (Rapson 223)

The character *lpi* (Whitehead plate 17 no. 36) appears in the coin inscriptions of Vima Kadphises, corresponding to the Greek ΚΑΔΦΙCΗC. Gardner (1886: 124) used the transcription *pi*, whereas Whitehead (1914: 183) wrote *ṭhphi* [*sic.*] following Rapson's proposal that the cross represents *tha* () turned 45º (Rapson 1905: 219). This character also appears in the Niya documents, e.g. (Rapson 220). Here the x-shape affixed to the base of *pi* was interpreted as a preconsonantal *l* on the basis of the form *jalpita* = Skt. *jalpita* (Boyer, Rapson, and Senart 1920–9: 316).[55]

3.3.15 *ś*-

śpa (BL 1 frame 28r 63-14)	*śma* (KDhp 67c2 [119])

[55] Rapson notes that this mark only occurs in combination with *p*, as elsewhere conjunct consonants with initial *l* are written in full (see §3.3.12 below), but sees no problem in reading the coin inscription of Vima Kadphises as *kalpiśa* (Boyer, Rapson, and Senart 1920–9: 316).

3.3.16 *ṣ-*

ṣka (KDhp 21a4 [21])	*ṣǵa* (Rapson 231)	*ṣṭa* (Rapson 233)
ṣṭha (Rapson 230) (Schøyen 42b 5-4)	*ṣḍhi* (Rapson 234)	*ṣta* (Rapson 235)
ṣthu (Konow plate 33 2-48)	*ṣpa* (KDhp 204d2 [250])	*ṣma* (Schøyen 65v 2-10)

3.3.17 *s-*

sthi (Rapson 241)	*spa* (Salomon 1986: 6)	*sma* (KDhp 91d6 [143])
smr̥̥ (BL 20 frame 54r 5-10)		

3.3.18 *z-*[56]

zbo (Rapson 185)	*zmo* (Rapson 186)

3.3.19 *h-*

hme (Schøyen 44v A1-20)

4.0 Syllabic Modifiers

In addition to the vowel diacritics (§1.2–6) and the diacritically modified conjuncts (§3.2), seven additional signs or strokes have been uses in different periods of

[56] On the use of the transcription *za* for , see §2.33 above.

the Kharoṣṭhī script to indicate modified syllables. The most common of these is the anusvāra.

4.1 Anusvāra

Aśokan	BL 9	Niya	Schøyen 1	Schøyen 2
aṃ	*aṃ*	*aṃ*	*aṃ*	*kaṃ*

References: Bühler 1895: 62; 1904: 26, 29; Boyer, Rapson, and Senart 1920–9: 300; Konow 1929: civ—cv, cxxiv; Brough 1962:70–1; Fussman 1985b: 37; 1989a: 473–9; Salomon 1998a: 55; Salomon 1998b: 140–1; Salomon 1999: 120–1, 211; Salomon 2000: §5.5.3, §5.9.3.

The use of the anusvāra is rather inconsistent in Kharoṣṭhī. In some documents (including the KDhp) it is not written at all, in others it is written where it is etymologically expected (including the Khvs-G), in some its use seems to be more or less random (e.g. *budha*^{m}*na*; Fussman 1985b: 37), and in a few it is attached to almost every character, the so-called "pseudo-anusvāra" (see Salomon 1999: 211).[57]

There are three types of anusvāra. The first, found in the Aśokan inscriptions and some coins of the Indo-Greek kings, consists of a *ma* written at the base of the stem of the radical, e.g. *aṃ* (Shāhbāzgaṛhī RE II 4-30). In combination with *ma*, the anusvāra is written directly beneath the *ma*, with the verticals protruding slightly on both sides, e.g. (Shāhbāzgaṛhī RE VI 16-79). Contrary to the opinions of Bailey (1943: 787–9) and Brough (1962: 70–1), there is a consistent distinction between *maṃ* and *mma*, in which

[57] This phenomenon may reflect a graphic confusion with the type 4 foot mark (see §I.9 above, and Fussman 1989: 474) and "a weakening of nasalization in the spoken Gāndhārī language" (Salomon 2000: 120). Pseudo-anusvāra is sometimes transcribed as a superscript ^{m}.

the second *m* is written below and to the right with its left stem touching the base of the first, e.g. (Shāhbāzgaṛhī RE IX 19-12).[58]

The second type of anusvāra consists of a hook open to the left attached to the base of the letter, e.g. *aṃ* (BL 9 frame 15r 1b6). The original *ma* shape is obscured in some of the later examples of this type, *aṃ* (Schøyen 44v A3-31). It is first seen in coin inscriptions of the Indo-Greek period, e.g. (Gardner plate 13 no. 3), and occurs in manuscripts and inscriptions throughout the rest of the Kharoṣṭhī period.

The third type is similar to the second, only it is written as a separate stroke floating beneath the radical, e.g. *kaṃ* (Schøyen 42a 1-5). This type is seen in combination with *ma* from the Indo-Greek period onwards, e.g. (Smith plate 6 no. 7), and with other radicals in the work of scribe 2 of the Schøyen collection .

In the Khvs-G anusvāra is sometimes written with the type 5 foot mark, e.g. *yaṃ* (BL 9 frame 15r 6a6).

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[58] Both of these authorities have asserted the identity of these two forms in support of their arguments for reading *ma* written with anusvāra in the KDhp as *mma*. While I do not dissent from their conclusions regarding the KDhp, I have found only one questionable example of a *maṃ* resembling *mma* in the Aśokan inscriptions (the second occurrence of the word *maṃgala[ṃ]* in S RE IX.19) but this could be an illusion owing to the effects of weathering on the rock. There are no examples of *mma* resembling *maṃ*.

4.2 Superscript stroke

References: Boyer, Rapson, and Senart 1920–9: 320–1; Brough 1962: 59–60; Salomon 2000: §5.9.5.

The characters *kṣ̄a, ḡa, ḡ́a, c̄a, j̄a, n̄a, m̄a, ś̄a, ṣ̄a, s̄a,* and *h̄a* all occur with a superscript horizontal line. With the exception of *ś̄a* and possibly *kṣ̄a*, this diacritic serves to indicate a modified pronunciation stemming from an underlying OIA consonant cluster. This device is first seen in the Aśokan inscriptions as a dot above *ja* (see §2.8.1), and had developed into a line by the time of the BL documents. For the details of this sign with each of the above forms, see the relevant sections in the treatment of the consonants above (for *kṣ̄a* see §3.1.1).

4.3 Cauda

References: Fussman 1985b: 37;

The characters *ǵa, ḡ́a, ја́, ḍ́a, t́a, d́a, ṕa, ḿi,*[59] *ýi, v́a, ṣ́a,* and *s̱a* all occur with a rightward projection from the base of their stems (or the *i*-vowel diacritic in the case of *ḿi*). With the exception of *ḿi* and *ýa*, this diacritic appears to indicate a modified pronunciation, in most cases fricativization. For the details of each of these forms, see the relevant sections in the treatment of the consonants above (for *ḿi* see §3.3.13, for *ýa* see §2.26 n.28). This stroke is first seen with *ǵa* in the inscription of the Meridarkh Theodoros (Konow 1929: 1-4; see also §2.3.1), and occurs most commonly with *ǵa* and

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[59] The character transcribed here as *ḿi* is found in the Wardak vase inscription, which Konow transcribed as *m(r)i* (1929: 166).

s̱a throughout the rest of the Kharoṣṭhī period. In the Bajaur casket inscription and the Traṣaka reliquary this mark is found affixed to many of the characters, and some of these should certainly be considered as foot marks rather than modified syllables. It is possible that this modifier developed out of the type four foot mark, see §I.4.4.

4.4 Long vowel sign

Boyer, Rapson, and Senart 1920–9: 298–9; .

The long vowel marker consists of a short oblique stroke drawn down to the right. It is first seen in the BL manuscripts (scribe 2), and also occurs in the KDhp, the Niya Documents, and some of the manuscript fragments from the Schøyen collection as well as a few inscriptions (although not in the three cases cited by Konow 1929: cxx, see §1.1.1). It has so far been noted with the vowels *a>ā, i>ī, u>ū,* and *e>ai* (see §§1.1.1, 1.2.1, 1.3.1, and 1.5.1 respectively).

4.5 Visarga

References: Senart 1914: 532; Boyer, Rapson, and Senart 1920–9: 299–300; Konow 1929: cxxi,167; Salomon 1998b: 142–3.

The sign for OIA visarga consists of two dots placed above the character, e.g. *taḥ* 𐨟𐨏 (Rapson 81). It is found in the few manuscripts written in Sanskritized Gāndhārī or Sanskrit, notably Niya documents nos. 523 and 661, the tablet from Endere, and the manuscript fragments in the Pelliot collection and Schøyen scribe 2. This sign is also

found once in the Wardak vase inscription in the name *Haṣthunaḥ* (Konow 1929: 167), although its phonetic value here is uncertain.

This sign is found in one of the Pelliot fragments in places where it is not expected, i.e. *daṃḍa*^{h} *saha*^{h}*sa* (Salomon 1998b: 142). This raises the possibility of a "pseudo-visarga," resulting perhaps as a hyper-Sanskritism rather than as an organic paleographic development.[60]

4.6 Infinitas

Reference: Boyer, Rapson, and Senart 1920–9: 299.

A sign resembling an infinity symbol, ∞, is written beneath a few characters in some of the Niya documents, particularly no. 511. Its value is uncertain, but is thought to indicate a modified vowel of some kind (see §§1.1.2 and 1.3.2 above).

4.7 Virāma

Reference: Boyer, Rapson, and Senart 1920–9: 297.

A final (i.e. vowel-less) consonant may be written in Kharoṣṭhī as a subscript, e.g. *dhik*  (Rapson 92). This expedient, the counterpart of the Devanāgarī virāma, has so far only been observed in some of the Niya documents (nos. 523 and 565).

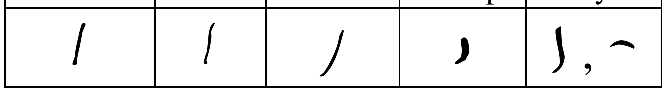
[60] Compare the comments on pseudo-anusvāra in §4.1 above.

5.0 Numbers

References: Taylor 1899: 263–8; Bühler, 1904: 73–4, §33; Boyer, Rapson, and Senart 1920–9: 321–2; Konow 1929: cxxvi–cxxvii; Das Gupta 1952: 51–62; 1958: 255–60.

5.1 One

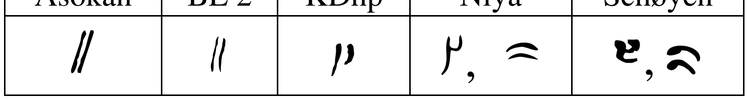
Aśokan	BL 2	Senior	KDhp	Niya



There are three types of the numeral 1. The first appears in all periods of the script in the form of a single downward stroke, e.g. (BL 2 frame 5v 9-3). The second type, found in some of the Niya documents, differs from the first by the addition of an oblique stroke drawn down to the left from the middle of the stem, e.g. (Rapson 254). Rapson suggested that this form may have developed in order to avoid confusion with *na* (Boyer, Rapson, and Senart 1920–9: 321–2). The third type, also from the Niya documents, is written horizontally, e.g. (Rapson 255).

5.2 Two

Aśokan	BL 2	KDhp	Niya	Schøyen



There are three types of the numeral 2. The first consists of simply of doubling the sign for 1. It is found in inscriptions and manuscripts up to the time of the KDhp, where the first stoke has become shortened in anticipation of rising to form the second vertical, e.g. (KDhp 314-4). This type is also found in the Niya documents, written

with two strokes, though here the base of the right vertical turns and touches the left vertical. The second type, found in the Niya documents and some Schøyen fragments (9b, 104a), is written horizontally, e.g. (Rapson 257), (Schøyen 9b C2-17).[61] The third type is written with a single stroke, by connecting the base of the first vertical to the top of the second with a small loop, e.g. (Schøyen 61+b 2-1).

5.3 Three

BL 2	KDhp	Niya	Schøyen
		,	,

The number three is typologically parallel to the number two. Up to the time of the KDhp it is written with three units, e.g. (BL 2 frame 3v 2-4). In the Niya documents and some Schøyen fragments it is sometimes written with three horizontal strokes, e.g. (Rapson 260), (Schøyen 29a B3-4).[62] A single-stroke type is found in some Schøyen manuscripts, e.g. (Schøyen 115a 1-4).

5.4 Four

Aśokan	BL 2	Senior	KDhp	Niya	Schøyen 2
				,	

[61] An almost identical form is found in North-Turkic Brāhmī, e.g. (Sander table 40 2-t).

[62] A similar form occurs in Gupta Brāhmī, e.g. (Sander table 20 3-h).

In the Aśokan inscriptions the number four is written with four vertical strokes. In all later documents it is indicated by a cross, e.g. 𐩃 (Senior 8r 6-16).

5.5 Five to Nine

The number five is written in the Aśokan inscriptions with five units, e.g. ///// (Bühler 5-8). In all later sources the numbers from five to nine are indicated by adding the basic numerals: 1(+)4=5, 𐩀𐩃; 1(+)1(+)4=6, 𐩁𐩃; 1(+)1(+)1(+)4=7, 𐩂𐩃; 4(+)4=8, 𐩃𐩃; 1(+)4(+)4=9, 𐩀𐩃𐩃.

5.6 Ten

Senior	KDhp	Niya	Schøyen 2
𐩄	𐩄	𐩄	𐩄

The number ten is found in the Senior, KDhp, and Schøyen manuscripts, as well as the Niya documents. It is written with semicircle open to the left.

5.7 Twenty

Senior	KDhp	Niya	Schøyen 2
𐩅	𐩅	𐩅	𐩅

The number twenty is found in the same sources as ten. It consists of two semicircles open to the left, i.e. a ten written above a ten.

5.8 Thirty to Ninety

The decades from thirty to ninety are written by adding the numerals for ten and twenty: 10(+)20=30, 𐩄𐩅; 20(+)20=40, 𐩅𐩅; 10(+)20(+)20=50, 𐩄𐩅𐩅; 20(+)20(+)20=60, 𐩅𐩅𐩅; 10(+)20(+)20(+)20=70, 𐩄𐩅𐩅𐩅; 20(+)20(+)20(+)20=80, 𐩅𐩅𐩅𐩅; 10(+)20(+)20(+)20(+)20=90, 𐩄𐩅𐩅𐩅𐩅. Units in combination with the decades are written to the left of the signs for the decades, e.g. 1(+)1(+)1(+)4(+)20(+)20(+)20=67 𐩀𐩀𐩀𐩃𐩅𐩅𐩅.

5.9 Hundred

Inscriptions	Niya
𐩆, 𐩆, 𐩆	𐩆

There are two types of the numeral for a hundred. The first is found in several inscriptions connected with the old Saka era (see Konow 1929: 52–81, 104–6). This older type consists of an oblique top line descending to the right, with a stem descending from either its mid point or the lower end, e.g. 𐩆 (Konow plate 13.2 line 3-4). The second, apparently unrelated type has so far been found only in the Niya documents. It consists of a 2-shaped figure with a short vertical stroke attached to the top, e.g. 𐩆 (Rapson 265). The origins of both types are uncertain, though a borrowing from Aramaic seems likely in the case of the latter, see following section. Multiples of a

hundred are formed with the corresponding numeral written before the hundred sign, e.g. 100(×)2=200, 𐩁𐩆.

5.10 Thousand

Niya
𐩇

References: Boyer, Rapson, and Senart 1920–9: 322; Bailey 1950: 121–3.

The Kharoṣṭhī sign for thousand has so far been found only in the Niya documents. Bailey has shown that it derives ultimately from the Aramaic word 𐡀𐡋𐡐 *ALP* ‘thousand’, which became abbreviated to 𐡋𐡐 *LP* before units and subsequently developed into the conventionalized symbol 𐩇 (Rapson 266); see Bailey 1950: 121–3. Multiples of a thousand are formed with the corresponding numeral written before the thousand sign, e.g. 1000(×)2=2000, 𐩁𐩇.

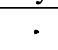
6.0 Punctuation

References: Salomon 1998a: 66–8; 1998b: 127; 2000: §5.6; Allon forthcoming: §5.5, §5.9.

Notation of punctuation varies considerably from one scribe to another. Some scribes, such as BL scribe 1, use two or more different signs to indicate different levels of punctuation. Others texts, such as the Niya documents, seem to use no punctuation signs at all.

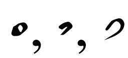
In the following description of the various punctuation signs, only preliminary remarks on their usage have been made, as only when all of the materials have been studied in detail will the complete picture become clear. For now, five basic types of punctuation have been distinguished on the basis of their graphic form.

6.1 Dots

BL 9	BL 21	Schøyen 1
		

This punctuation mark occurs in the several of the BL manuscripts (scribes 4, 5, 9, 10, 14, 20, and 21) as well as the some of the Schøyen fragments (8b). In the Khvs, it is used to separate the pādas in verse 1, and the verse citations of the uddāna (see Salomon 2000: §5.6). BL scribe 21 uses it to indicate a phrase or sentence break, and sometimes to separate items in a list.

6.2 Circles

BL 1	BL 9	KDhp	Senior	Schøyen 2
				

Circles of various sizes and degrees of completeness are used by BL scribes 1, 2, 4, 6, 9, 10, 13, 15, 17, 19, and 20, as well as in the Senior manuscripts, the KDhp, and some of the Schøyen fragments. In BL fragments 12 and 14 (for details see Allon forthcoming), small circles are used to indicate phrase or sentences breaks, or to set off

lists of items, as well as half verse divisions, i.e. after pādas b, d, and f. In the Khvs and the KDhp, circles mark the end of a verse.

Punctuation circles are formed in a single clockwise stroke from the top left. In the KDhp, incomplete circles are common, with the end of the stroke tailing off to the lower left instead of returning to the start point, e.g. (line 250). Compare the similar development in the circular form of the *u*-vowel diacritic (above, §1.3).

6.3 Circles with internal motifs

Punctuation signs with internal motifs are found occasionally in the BL manuscripts (scribes 1, 6, 10, 16 and 18), and more often in the Schøyen collection. Judging by their frequency in the BL documents, they probably indicate a major break such as a section or chapter. The sign (Salomon 1998b 1a l.2-3, page 127) is included here as it seems to be related to (Schøyen 49a). The same sign is also found in the Oldenburg fragment (l.2-10).[63] Two BL scribes (1 and 18) use an equivalent sign based on a square rather than a circle, e.g. (BL 1 frame 2r 17-10) and (BL 18 frame 41r-3-44).

(BL 1 frame 2r 17-10)	(BL 18 frame 41r 3-44)	(BL 6 frame 11r 35-15)
(BL 10 frame 15r 1)	(BL 16 frame 34v 6-5)	(Schøyen 49a)

[63] An almost identical character is found in the northern Gupta alphabet, e.g. (the reversal of the form is no doubt due to the opposite direction in the Brāhmī script). For details see Sander 1968: 97.

(Schøyen 56a)	(Schøyen 8a)	(Schøyen 72a)
(Schøyen 100a)		

6.4 Circles with external motifs

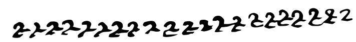
Signs of this type consist of circles or dots surrounded by other circles or dots, e.g. (KDhp line 246). These are found in some BL manuscripts (scribes 4, 7, 12, and 21) and the KDhp. In the KDhp this sign is sometimes used to indicate the end of a chapter. BL scribe 7 sometimes writes this punctuation mark with a numeral at its center rather than a circle, e.g. (BL 7 13v 9-4), where the numeral indicates the number of the avadāna in the series.

(BL 4 frame 27r 24-7)	(BL 7 frame 13r 23-12)	(BL 7 frame 13v 9-4)
(BL 12 frame 22v 9-19)	(BL 21 frame 52r 66-24)	(KDhp l. 246)

6.5 Elongated motifs

Signs of this type occur in the BL manuscripts (scribes 9 and10), and the KDhp. In the Khvs the sign separates the verses from the uddāna. In the KDhp it is used to indicate a chapter break.

* (BL 9 frame 15r)	(BL 10 frame 15r)	(KDhp l. 100+)

 (KDhp l. 159+)	 (KDhp l. 211+)	 (KDhp l. 246+)
* (KDhp l. 269+)	 (KDhp l. 331+)	 (KDhp l. 349+)
(KDhpl.384+)		

6.6 Spaces

A space is used to indicate word breaks in only a few documents, e.g. the Bajaur casket (see Fussman 1993: 101 n. 69). In both the KDhp and the Khvs the verses are written one to each line with spaces separating the pādas, while other verse texts in Kharoṣṭhī, such as the *Anavatapta gatha (BL Fragment 1) write the verses continuously. In Senior 8r, the text has been laid out in four columns separated by spaces about 1cm wide. However, this seems to be partly a visual effect, as the word *nireya* is broken across the second space in line 1. Blank spaces will often occur when there is a defect in the writing surface, such as a knot or rough area. Some manuscript fragments in the Schøyen collection have spaces surrounding the thread holes to allow for wear and tear, as is the standard practice with palm leaf manuscripts.

6.7 Decorative marks

BL scribe 4 has drawn a lotus at the end of the recto of BL Fragment 13.

BL 4


7.0 Scribal corrections

References: Salomon 1998a: 68; Salomon 2000: §5.7; Allon forthcoming: §5.6.

Corrections and omissions are indicated in the manuscripts in various ways. In the Khvs the scribe has simply written over an incorrect character without attempting to erase it, or else he has modified the overall form of the character to accommodate an omitted element. For example the irregular form of *tva* in 20b6 (compare the normal form in this hand) appears to be the result of first writing a regular *ta*, then adding a large *v*-stroke secondarily.

BL scribe 1 writes corrections by inserting interlinear additions below the line to which they refer. Other scribes (such as BL scribe 21) make interlinear corrections above the line they refer to.

Another common method of making corrections is to blot a character, perhaps with a piece of cloth, or maybe a finger. In some cases this is quite effective in removing the ink (e.g. frame 24r 16-7), but often it leaves a large smudge (e.g. frame 24r 68-3). In several cases, particularly towards the end of BL fragment 14, this scribe has smudged a character in order to erase it.

A few scribes have used the margins to make corrections and additions, for example in Senior manuscript 5v *śavasti ṇi* has apparently been added at the top of the scroll.

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Appendix A

Reverse Index of Combined Characters

-k-: *khkṣa, ṣka.*

-kh-: *rkha.*

-g-: *nga, pgu, rga.*

-ǵ-: *ñge, tǵa, nǵe, pǵe, mǵe, ṣǵa.*

-c-: *rce.*

-j-: *rja.*

-ñ-: *jña.*

-ṭ-: *ṭṭo, rṭa, ṣṭa.*

-ṭh-: *ṣṭha, ṣṭhva.*

-ḍh-: *ḍdhi, ṣḍhi.*

-ṇ-: *rṇa.*

-t-: *kta,* k^{i}*tsi, khti, gtsi, tta, pte, rta, ṣta, sta, stra.*

-th-: *rtha, ṣthu, sthi.*

-d-: *rda.*

-dh-: *rdha.*

-n-: *ǵnu, rna.*

-p-: *lpa, lpi, rpa, śpa, ṣpa, spa.*

-ṕ-: see §II.3.2.5.

-b-: *zbo.*

-bh-: *rbha.*

-m-: *kma, cma, tma, tsma, mma, rma, rmi, rmu, lme, śma, ṣma, sma, smr̥, zmo, hme.*

-y-: *rya,* see §II.3.2.1.

-ý-: see §II.3.2.5.

-r-: *mra, rvra,* see §II.3.2.3.

-v-: *rva,* see §II.3.2.4.

-ś-: *rśa.*

-ṣ-: *kṣa, khkṣa, mṣo, rṣa.*

-s-: k^{i}*tsi, khsa, gtsi, tsa, tsma, psu, psya.*

-h-: *vha.*

Appendix B

Comprehensive Charts of Selected Scribes

Table 2 – Kharoṣṭhī script as written by British Library scribe 1

Basic characters

	a	i	u	e	o
Independent vowels	24r 34-1 24r 39-7 24r 44-13 24r 47-1 28r 57-5 28r 57-24	25r 12-29 24r 35-17	25r 8-6	24r 38-1 28r 55-17 24r 25-20	25r 7-6 28r 61-16
k-	24r 32-18	5r 98-5	24r 51-8	4r 95-4	
kh-	24r 22-20		24r 27-6		
g-					
gh-	24r 33-11 24r 38-2	5r 109-3	24r 18-1 28r 66-6	25r 5-4	24r 20-2
c-	24r 38-6 28r 59-13	24r 42-3 24r 51-14	2r 48-10	25r 4-9	
ch-	24r 43-8	5r 103-7	25r 7-16		
j-	24r 45-19 28r 59-7	24r 52-8	2r 46-22	24r 26-10	
ǰ-		2r 52-7			
ñ-	28r 56-15		24r 19-11	24r 18-20	

Table 2 continued

	a	i	u	e	o
ṭ-	4r 75-2	2r 37-24			25r 1-2 25r 5-2
ṭh-	28r 53-5	2r 49-18 4r 71-2	25r 12-3	4r 95-25	
ṭ́h-	2r 43-4 4r 85-19	2r 50-17 24r 30-3 28r 61-20			
ḍ-	2r 35-7	24r 26-18 24r 37-1	2r 43-21	24r 22-24	
ḍh-	24r 21-2				
ṇ-	24r 25-17 24r 31-9 24r 32-5	24r 32-11 24r 49-2 28r 64-10	25r 8-27	24r 39-6 24r 31-18	24r 28-7 24r 39-8
t-	24r 28-8 24r 32-6	24r 45-8	24r 32-19	24r 27-4 24r 29-12	24r 33-2
th-		3r 54-15	5r 117-6	2r 16-9	

Table 2 continued

	a	i	u	e	o
d-	24r 15-7 24r 19-3 24r 45-11	25r 11-3 25r 12-30 28r 53-18 28r 59-8	24r 26-1	24r 25-9 28r 70-10	24r 43-9
dh-	24r 24-2 24r 32-2 24r 48-1 28r 68-13	2r 39-22	2r 18-17	4r 92-20	24r 25-1
n-					
p-	24r 51-4	24r 26-17	28r 61-14	5r 102-21	
ph-	2r 21-6		28r 53-7		
b-	24r 39-2		24r 32-1		
bh-	24r 25-6 28r 61-1	24r 32-7 24r 50-19 24r 52-5	24r 20-1		5r 121-4
m-	24r 25-4	24r 18-10	24r 23-6	24r 38-9	
y-	24r 16-8 24r 32-4	28r 55-27	5r 115-16	28r 53-2	2r 36-1

Table 2 continued

	a	i	u	e	o
r-	24r 33-12 24r 39-9	24r 38-8	28r 64-8	24r 24-3	24r 30-9 24r 32-17
l-	28r 55-1 28r 61-11	24r 18-3	5r 106-3	24r 31-8	25r 5-22
v-	25r 2-9 25r 3-8 24r 25-8	25r 9-11 24r 26-6	28r 72-3	25r 9-1 24r 32-9	
ś-	24r 26-2 24r 51-9	24r 22-28	25r 10-11 24r 22-15	24r 33-6	
ṣ-	24r 32-12 28r 68-12	24r 25-13 28r 69-1	24r 43-10	5r 105-5	4r 64-18
s-	25r 2-10 24r 26-20 24r 39-1	28r 57-6	24r 32-15	28r 56-11	25r 4-3
h-	24r 26-7	24r 19-6 24r 41-5 24r 50-4		24r 43-18	25r 10-18 25r 12-13

Table 2 continued

Conjunct characters

kra 25r 3-14	kri 24r 22-13	kro 24r 22-16	kva 5r 103-6	kṣa 24r 39-1	kṣi 24r 17-1
kṣu 25r 10-4	kṣe 5r 102-14	ghra 24r 50-3	ghri 5r 98-19	ghre 24r 24-8	ghro 2r 30-5
tra 24r 37-9	tri 4r 71-13	tre 24r 27-2	tro 2r 10-8	tva 24r 38-7	tvo 4r 97-6
tse 4r 79-5	dhra 25r 9-7	dhri 24r 49-3	dhre 24r 21-32	dhro 24r 46-7	pra 24r 39-4; 28r 68-6
pri 2r 50-20	pre 4r 94-11	pro 28r 53-4	bra 24r 18-11	bro 24r 47-14; B50-23	bhra 2r 16-11
rkha 3r 57-4	rci 4r 84-10	rce 4r 86-2	rṇo 24r 22-14	rdhi 4r 69-1	rpe 4r 73-10
rbha 24r 17-4	rma 24r 48-2; 28r 55-3	rmi 2r 28-16	rmu 2r 34-4; 2r 32-9	rva 24r 19-11	rve 4r 68-10
rvo 25r 9-8	rśa 24r 48-7	rśi 2r 15-4; 4r 96-2	rśe 4r 94-5	rśo 4r 96-6	rṣa 5r 123-11
rṣi 2r 29-4	śpa 5r 103-2; 28r 63-14	śpi 24r 18-5	śpu 5r 123-2	sta 24r 17-5	sti 24r 26-4
stu 24r 51-3	ste 4r 64-16	stri 2r 52-13	sri 3r 56-9	sre 2r 49-17	

Punctuation

24r 38-5	33r 7-6	2r 17-10	24r 25-19

Table 3 – Kharoṣṭhī script as written by British Library scribe 9

Basic characters

	a	i	u	e	o
Independent vowels	15r 36b1 15r 5a3	15r 37a3 15r 34b6 15r 19a4	15r 36a3	15r 33d1 15r 26c11	15r 33a4
k-	15r 33a9 15r 18b4	15r 38a1	15r 33a6		15r 19b8
kh-	15r 26d5 15r 17d5		15r 28a5		15r 35a11
g-	15r 39b2 15r 15a6	15r 19a6	15r 28b1	15r 38a11	15r 5a2 15r 5b8
gh-					
c-	15r 28a4	15r 39c10		15r 37a10	15r 29b5
ch-	15r 5b6 15r 5b3	15r 23a8			
j-	15r 13a9 15r 32a9 15r 19a9				
j̄-	15r 29a5			15r 7a11	
ñ-	15r 6b5 15r 38a3 15r 1b7		15r 14b2	15r 5a11	

Table 3 continued

	a	i	u	e	o
ṭ-					
ṭh-	15r 13b11	15r 16b9			
ḍ-	15r 19a3 15r udd. 1d11	15r 24a7 15r 30b7			15r 19b11 15r 1a11
ḍh-	15r 38b8				
ṇ-	15r 29a11 15r 36a8	15r 33a8 15r 38a6 15r 39b1	15r 38a8 15r 18b3		15r 29a6
t-	15r 35b1 15r 38a4	15r 28b7 15r 30a9	15r 34b2	15r 1a5	15r 29a4 15r 30a11
th-		15r 39a11			
d-	15r 20a2 15r 32b3		15r 39b5		15r 35a4
dh-	15r 6a7 15r 24b7	15r 25b10			15r 5a5
n-					
p-	15r 30b6 15r 6b1 15r 18a1	15r 1b10	15r 4b1		15r 17d11
ph-	15r 15b2				

Table 3 continued

	a	i	u	e	o
b-	15r 24b1	15r 34c11			
bh-	15r 36a10	15r 20b5	15r 1a4	15r 25a4	15r 38b4
m-	15r 38a7 15r 18a6	15r 39b10 15r 18a4	15r 36b6	15r 29b2	15r 33b2
y-	15r 28a6	15r 25a2 15r 24c7	15r 32a4	15r 5b1	15r 26a11 15r 15c8
r-	15r 37a7 15r 39a9 15r 39b3 15r 35a1	15r 13a7 15r 25b9	15r 36a7	15r 26d4 15r 17d4	15r 25b11
l-	15r 26a3 15r 38b3 15r 23b2		15r 33a3	15r 37b4	15r 38a10
v-	15r 40b1 15r 32a8 15r 4a6	15r 32a3	15r 23a10	15r 36a4	15r 40b5
ś-	15r 38a9 15r 20b9 15r 14b4 15r 37b5	15r 19b2 * 15r 23a1			15r 4a2

Table 3 continued

	a	i	u	e	o
ṣ-	15r 35a5 15r 15b3		15r 24b3	15r 25c9	15r 4b6
ṣ̄-	15r 35b2				
s-	15r 1a1 15r 29a1	* 15r 21b6	15r 38b1	15r 39a4 15r 36b2	15r 37a12
s̱-	15r 28a7			15r udd. 2a7	15r 25b6 15r 18b8
s̄-				* 15r 2b1	
h-	15r 25a10 15r 26b8	15r 27a4 15r 1c7		15r 1b3	15r 33a7 15r 24b2

Characters with anusvāra

aṃ 15r 1b6	kaṃ 15r 32b4	chaṃ 15r 34c10	taṃ 15r 18a8	tiṃ 15r 28b2	daṃ 15r 1a10
dhaṃ 15r 29b8	paṃ 15r 37a4	baṃ 15r 20a8	maṃ 15r 32b8	yaṃ 15r 6a6 15r 39a2	raṃ 15r 5a10
laṃ 15r 20b8	vaṃ 15r 39a5	viṃ 15r 14b1 15r 19a8	saṃ 15r 32b1 * 15r 20a1	staṃ 15r 14b5	

Table 3 continued

Conjunct characters

kri 15r 7a2	kṣa 15r 28b6 15r 23a2	kṣi 15r 28a2	kṣo 15r 33b11	gra 15r 6b3	gri 15r udd. 2a9
tra 15r 24a5 15r 18a5	tre 15r 4b2	tro 15r 19b5	tva 15r 6a11 15r 20b6	tsa 15r 24c9	dra 15r 23a9
dri 15r 28b3	dva 15r udd. 2d9	pra 15r 30b1	mra 15r 33b10	mri 15r 5a1	rga 15r 26d6
rti 15r 23a11	rtha 15r 133b	rdha 15r 25b2	rya 15r udd. 2a5	rva 15r 35b5	rve 15r 1a2
staṃ 15r 14b5					

Punctuation

15r udd. 1-14	15r udd. 2	* 15r 40+

Table 4 – Kharoṣṭhī script as written by British Library scribe 21

Basic characters

	a	i	u	e	o
Independent vowels	51r 3-14	52v 93-29	52r 44-20	52v 78-19	51r 2-34
k-	51r 2-25	51r 29-8	52v 92-10	51v B3-3	* 51v D5-5
kh-	52v 80-29		51v 144-6		
g-	52r 66-16 52v 82-13		51r 41-7	51r B5-11	51r 19-16
gh-					
c-	51r 2-24	51r 38-15	51r 14-4	52r 85-29	
ch-		52v 82-6		52r 66-26	
j-	54r 43-23	52r 65-10			
j̄-	52r 53-20				
ñ-	51v 144-7			51r 18-2	
ṭ-					
ṭh-	52v 78-15	52r 53-6			
ḍ-	52r 69-19	52v 90-20			
ḍh-					
ṇ-					
t-	52r 53-9	51r 15-15	52r 66-30	52r 66-12	

Table 4 continued

	a	i	u	e	o
th-	51r 36-20	51v 123-17			
d-	52r 69-23 52r 66-7	51r 15-18	51r 1-17	51r B2-6	51r 36-19
dh-	52r 43-14 52r 66-8				
n-	51r 15-26	52r 53-18 52r 54-4	52r 66-5	51r 15-25	52r 69-11
p-	51r 18-2	51r 18-2	51r 18-2	51r 18-2	
ph-					
b-	52v 93-10		51r 18-23		
bh-	52r 73-18	52v 78-6	52v 88-11		52v 86-22
m-	51r 3-3	51r 28-26	51v E2-11	52r 49-13	51r 36-15
y-	51r 15-16	52v 80-20	52v 87-24	52r 69-16	51r B3-4
r-	51r 3-23	52v 63-9	52r 53-19	51r 2-26	52r 66-11
l-	52r 57-15	51r 41-19		52r 58-10	52r 57-21
v-	51r 3-52	51r E2-19 51r E5-17	51r E1-8	52r 68-6	52v 74-16
ś-	52r 43-19	51v E6-12	51v 111-19	51r D4-7	
ṣ-	52v 76-5	51v E4-6	51v 102-10	52r 84-24	51v E4-3

Table 4 continued

	a	i	u	e	o
s-	52v 81-21		51r 2-28	52r 69-31	52r 59-7
s̱-	52r 44-19	* 52r 66-28			51r 36-4
h-	52v 82-20	51r B2-7		51r 1-16	

Characters with anusvāra/ pseudo-anusvāra (see §II.4.1)

pa^{ṃ} 51r 28-20	pe^{ṃ} 51v 115-13	po^{ṃ} 51v 127-23	maṃ 51v 120-4

Conjunct characters

kṣa 52v 81-10	kṣi 51v 115-9	gra 51v 115-27	gri 52r 46-20	tra 52r 67-14
tre 52v 87-20	tva 52v 78-5	tve 52r 84-14	dri 51v 102-25	pra 51r 15-17
pro 51r 36-5	psya 52r 46-22	bra 52r 45-1	bro 51r 28-25	rja 52v 90-8
rta 51r 12-20	rti 51r 32-11	rtha 52r 49-11	rthi 52r 65-17	rya 52v 62-32 52v 63-16
rye 51r 36-25	rva 52r 67-8 52r 68-9	rve 51v 105-5	sti 52v 82-17	smi 52r 41-2
sva 52v 100-15				

Punctuation

78-18	66-24

Table 5 – Kharoṣṭhī script as written by the Khotan Dharmapada scribe

Basic characters

	a	i	u	e	o
Independent vowels	110a8 109a4 119c1 315b4 106a6	125c3 332a1 113b2	122d8 322d8 109b5	165c3 107d1 108d1	122c6
k-	114d3 111d3 121d5 56b6	110d4	109c3 122c5 97c4	96c11 4d3	301c1
kh-	107a7 123a6 3c2	0d6	109d7	59d4	
g-	51d4 113c5 213d4 275d3	3d2	107d4 97a8	21b3	108d4

Table 5 continued

	a	i	u	e	o
g̅-		109a6			
ǵ-	14d3 39a4 46c3 78c4 305b2	312c4 278a8			
ǵ̄-	102d4				
gh-	107a4				
c-	106a6 110c3	19a5	115b5	88b9	152a8 1279d3
ch-	* 121c2 129d7	71c4	144d3	76c1	
j-	125c4 111d2	112c8	321d2	110a7	236a4
j̄-	104a7	303b2	70c4		
ñ-	107b4 331d7	227c3	126a8	46a4	14c8 35c7

Table 5 continued

	a	i	u	e	o
ṭ-					
ṭh-	109a5	121c4	28b3	197b2 201c7	109c5
ṭ́h-	112a2	144c3		113a9	119e4
ḍ	75c5	70c2	331a6		
ḍh-	112d10 339c7		186d8		
ṇ-	145a8 108a6 315b7	106a7	113a8	113a3 29b4 29c3	112b11
t-	106c1	28b6 44b3	125b4	118b2	122d4
th-	123d3 126b4	201f8	1d3	303b8	
d-	106b2 110b6	106a8 107a8	113a11 106c7	119a7	112a5

Table 5 continued

	a	i	u	e	o
dh-	107b7	9d5 *107d7	101a4 322b5	15b5 18c7	97c2
n-	1a1	106c3 108c3	119b3	66a4	134d2
ñ-	92d4				
p-	106b6 308b4	319c5	5a1 122a3	*229a5	145c2
ph-	114d6	228b1	66a1	300a1	
b-	113b3 3d5	114c5	123b4 302c1		242a4
bh-	105d1 114b6	111d5	109d3 18a6	76b6	114e7 93d4 124b4
m-	107d3	20d5 38d5 47d5 120b5	318d5 114d2	133c7 111b3	130a6 162d6

Table 5 continued

	a	i	u	e	o
y-	106b5 79c7 131c7 317b8	112b2 110d8	71b4 123b1	146a1 115d1	113b1
r-	107a5	109b6	118b8 119c7 4d5	98d6	111c4
l-	113a5 113b6 56c1	113b4 21c3	133a4 173d3	319c7	110d3
v-	302d7	106c4	53b7 111c2	126d6	144b8
ś-	313d8	124b2	79a3	88a5	119d2
ṣ-	340a2	125b	114c6 65c3	306c7	107d2
ṣ̄-		237c5			

Table 5 continued

	a	i	u	e	o
s-		175d8	110b3 122d6		122c1
s̱-	107a3	121b8		121a6	80d5
h-	113a10	118d1	46b2 133c5	54a3	114b5

Miscellaneous Characters

ā 269b10	saṃ 36a6	sr̥ 48b7

Conjunct characters

kra 280c3	kro 45a2	kṣa 93d7	kṣi 7b3	kṣu 170b13	kṣe 94d1
kṣo 284d4	khkṣa 217f4	khkṣu 251d2 253b7	gra 107b6	tma 227a2	tra 97d3
tri 6a4	tre 1a8	tva 108a7	tvu 9d3	tsa 113c2	tsi 32a3 142c2
tsu * 38a2 75b9	tse * 139d4	dra 118c7	dri 19a3	dru 2a6 23b6 51d3	dro 215c4

Table 5 continued

dva 12b4	dhva 132c4	pra 107b3 125c1	pri 15b9	pru 47c1 326c6	pre 30a5
pro 240a7	bra 1b6	bro 17a7	mma 56a6	mru 133d4	rga 49b4
rṇa 186b2	rṇu 251b7	rṇo 7a8	rta 172d4	rtha 24c2	rthe 245a7
rda 111d7	rdha 172c7	rbha 7b7	rma 0a4	rmi 197b5	rmu 0d2
rme 14a7	rmo 3a4	rya 316d2	rye 8a7	rva 178d2	rvi 14c5
rvu 87b2	rve 5a2 195c2	rśa 175a4	rṣa 21b7	vra 188b2	vri 172b3
vru 23c2	vha 120a8	vhu 228b6	śpa 66c4	śma 67c2	śra 16b5
śru 249c1	śva 238a5	ṣka 21a4	ṣpa 204d2	sta 53a2	sti 23b5
stu 210f3	sto 210f1	stra 192b3	sma 91d6	sya 23a2	sva 124a5
svi 110d2					

Numbers

1 314+	2 314+	3 402+	4 314+	10 314+	20 50

Punctuation

244	247	250	246	100+	159+
211+		246+		* 269+	331+
349+		384+			

Table 6 – Kharoṣṭhī script as written by Schøyen scribe 1

Basic characters

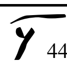
	a	i	u	e	o
Independent vowels	 44r A1-12  44r C2-15	 add.r 3-12	 44v C2-5	 44v A3-37	
k-	 44r B2-10		 44v A3-7	 44r A1-30	 44v A3-38
kh-			 44r C1-2		 44r A1-8
g-	 44r C1-14  44r C2-12				
gh-	 add.v 1-5				
c-	 44r A1-13	 44r B2-6		 108v 1-10	
ch-					
j-	 add.v 2-12				
j̄-	 44r A3-21				
ñ-					 44r A3-10
ṭ-					
ṭh-		 add.v 3-18			
ḍ-					
ḍh-	 44r A2-10	 44r A2-30			
ṇ-					
t-	 44r C1-13	 44v C1-9	 44r A3-30	 44r C2-11	 44r B2-4
th-	 44r C1-14			 44r A3-34	

Table 6 continued

	a	i	u	e	o
d-	44v C1-7	44v B1-13			
dh-	44v B1-5	add.v 3-27	65r 2-11		44r A1-28
n-	44r C1-12	65v 1-6 65v 1-15	44v B1-9		44v A1-18
p-	44r C1-8	44r C1-9	44v A1-9		
ph-					
b-					
bh-	44r C2-10	44r C1-3		add.r 3-10	
m-	44r C1-6	44r B1-9		add.r 1-25	44r C1-10
y-	44v A1-12	44r A1-36	add.v 1-28	44r C1-11	44r B2-13
r-	44r B1-8	44r B2-9			44r C1-7
l-	44r A1-17			44r A2-38	
v-	44r C2-14	44r B1-6		44r C1-5	
ś-	44r A2-4	65r 1-8			add.v 1-7
ṣ-	65v 1-13	add.v 3-4			
s-	44r A1-8	add.r 2-17	44r A1-7		44v A2-37
s̄-	44v A1-34				
h-	44r B1-7	add.v 1-12	add.r 1-2	44r B1-5	65r 2-1

Table 6 continued

Characters with anusvāra

aṃ 44v A3-31	kaṃ 44v C2-8	kiṃ 44r B2-5	gaṃ 44r A1-27	ghaṃ add.r 1-19
chaṃ add.v 3-15	tvaṃ add.v 3-2	daṃ 44v C2-9	dhaṃ 44v B1-10	naṃ 44r C2-9
paṃ 44v B1-14	bhaṃ add.v 1-8	maṃ 44v B2-7	yaṃ 108v 1-9	yiṃ 44v A3-5
rnaṃ 44v A2-38	rmaṃ 44v A2-24	vaṃ 44r A3-32	veṃ add.v 3-26	saṃ add.r 1-18
haṃ 44v B2-4				

Conjunct characters

kta add.r 2-25	kra 65r 1-4	kṣa 44r C1-4	kṣi 44r A1-5	kṣu add.r 2-8
gri 44r B1-4	tre 108r 1-11	tva add.r 1-27	dro 44r A1-1	dhva 44r A1-22
pta 44v A3-21	pra 44r C2-6	pri add.v 3-21	bra 44v A1-19	mri 44v A3-38
rji 44v A1-29	rta add.r 2-3	rti 44r C2-8	rtha 44v C1-7	rna add.r 1-17
rpa 44r A3-33	rma 44v B1-8	rmo 44v A2-15	rva 44v B2-11	rśa 44r A3-19
lya 65v 1-3	vya add.r 2-24	śru add.r 1-3	ṣki 44v A2-27	ṣma 65v 2-10
stra 44r A2-21	stha 108r 1-7	sthu 44r A3-31	sya add.r 2-9	sva 44v C1-5
hme 44v A1-20				

Punctuation

44r C2-5

Table 7 – Kharoṣṭhī script as written by Schøyen scribe 2

Basic characters

	a	i	u	e	o
Independent vowels	42a 2-11	115b 4-9		61a C1-5	
k-	53a 3-5	42a 1-10	42a 3-5	115a 3-6	
ḱ-	42B 3-3				
kh-	115a 3-13	115a 5-7			42B 2-19
g-	42B 1-5		115B 5-2		
gh-	42a 4-9				
c-	42B 1-4	115a 4-9	61a B2-2	61a F3-3	
c̄-	42a 2-8	115B 2-9			
ch-					
j-	42B 1-2	61a D1-2			
j̄-	115a 4-15				
ñ-	115a 1-5				
ṭ-					
ṭh-					115a 2-15
ḍ-					
ḍh-					
ṇ-					
t-	42a 4-6	42a 4-14		42a 2-20	42b 4-2

Table 7 continued

	a	i	u	e	o
th-	115a 5-10	115b 3-9			
d-	42b 3-14	42a 1-7			
dh-	42b 2-3	115b 1-10	115b 4-1		98b 2-4
n-	42b 2-2	42a 2-3	Misc. 1.4b 2-4	42a 4-12	55a A1-3
p-	42a 3-11	61+b 2-3	42a 3-13		
ph-					
b-	115a 5-12				
bh-		55b A2-3	61+b 2-4		
m-	42b 3-5	115a 5-4	42a 3-8	42a 2-18	
y-	42b 1-11	115a 4-1			42a 2-2
r-	42b 1-8	42a 2-9	61+a 2-4		115b 2-7
l-	42a 3-7	42a 1-4			115a 3-5
v-	42b 1-19	42b 4-14			42a 4-7
ś-	42a 3-6				
ṣ-	61+a 4-5	42a 1-2		42b 4-3	
s-	42a 2-5				42b 4-7
h-	53a 3-2	61a C2-7		98b 2-2	

Table 7 continued

Characters with long vowels

ā 42b 5-3	kā 42b 2-13	ḱā 42b 4-10	khā 61a C1-4	jā 61a F3-8
ñā 42b 3-20	thā 42b 2-11	dā 61a F3-2	dhā 61+b 3-2	nā 61+a 3-3
bhā 42b 4-15	mā 42b 4-5	yā 42a 1-14	rā 42a 3-14	lā 42a 3-9
vā 115b 2-14	sā 115b 5-5	sī 61+a 2-2	hā 98a 1-3	

Characters with anusvāra or visarga

kaṃ 42a 1-5	ñaṃ 115b 1-11	taṃ 42a 2-10	naṃ 115a 4-13	baṃ 115a 5-12
maḥ 115b 5-14	maṃ 115b 5-13	yaṃ 115a 3-8	rmaṃ 115a 3-15	rvaṃ 42a 2-6
vaṃ 115a 5-5	viṃ 115a 5-11	śuṃ 42b 3-19	saṃ 42a 2-17	

Conjunct characters

kri 115a 1-6	kṣa 115a 3-7	jña 42b 4-13	ṭhva 115b 3-2	tta 115a 4-10
tya 61+a 3-1	tra 42b 3-6	tva 42b 4-18	dri 115a 2-14	dru 42a 2-7
dhya 42a 4-8	pra 42a 2-19	bra 115a 3-5	mri 115b 2-4	rta 61a B1-3
rma 42b 2-4	rvaṃ 42a 2-6	rve 42a 1-17	śru 115a 2-7	ṣṭha 42b 5-4
ṣṭhva 61+b 4-3	ṣye 115b 3-11	sta 61ba 2-3	sva 115b 4-5	hya 115a 3-3

Numbers

2 61+b 2-1	3 115a 1-14	4 115a 1-13	10 115a 1-12	20 115a 5-13

Punctuation

115a 3-4	61b C3-5

Appendix C

Concordance of Scribes, Fragments, and Frames in the British Library Collection

Scribe	Jar	Fragment	Frame
1	J1-1	1	1
2			
1	J1-2		2
1			
2			
2			
1	J1-3		3
2			
1	J1-4		4
1			
2			
2			
1	J1-5		5
1, 2			
2			
2			
2	J2-1	2	6
2			
3, 4	J2-2	3	7
2			
2			
2, 5			
6	J3-1	4	8
6			
2			
2			
6	J3-2		9
6			
2			
2			
6	J3-3		10
2			
6	J3-4		11
6			
2			
2			
6	J3-5		12
2			
6, 7	J3-6		13

Scribe	Jar	Fragment	Frame
7			
7, 2			
7			
7	J3-7		14
7			
7			
7			
8, 9	J4-1	5	15
9, 10			
9			
10			
11	J4-2	6	16
11			
4	J4-3	7	17
4			
3	J4-4	8	18
3			
4	J5-1-1	9	19
4			
4	J5-1-2		20
4			
4	J5-1-3		21
4			
4			
4			
12	J5-2	10	22
12			
12			
12			
13	J5-3	11	23
13			
1	J6-1-1	12	24
1			
2			
2			
1	J6-1-2		25
2			
4	J6-2-1	13	26
14			

Scribe	Jar	Fragment	Frame
4	J6-2-2		27
4, 14			
1, 2	J6-3	14	28
2			
15	J7-1	15	29
15			
15	J7-2		30
15			
15	J7-3		31
15			
15			
15			
15	J7-4		32
15			
15			
15			
1,2	J8-1	16	33
2			
16	J8-2	17	34
16			
4	J8-3	18	35
4			
17	J8-4	19	36
17			
17			
17			
18	J9-1	20	37
18			
18			
18			
18	J9-2		38
18			
18			
18			
18	J9-3		39
18			
18	J9-4		40
18			

Scribe	Jar	Fragment	Frame
18	J9-5		41
18			
2	J10-1	21	42
13			
19	J10-2-1	22	43
19			
19	J10-2-2		44
19			
18	J11-1	23	45
18			
18			
18			
18	J11-2		46
18			
13?	J12-1	24	47
13?			
1,2	J12-2	25	48
2			
20	J12-3-1	26	49
20			
20			
20			
19?	J12-3-2	27	50
19?			
21	J13-1	28	51
21			
21			52
21			
20	J13-2-1	29	53
20			
20			
20			
20	J13-2-2		54
20			
20			
20			
20	J13-2-3		55
20			